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# ***JPRS Report***

## **Soviet Union**

### ***AVIATION & COSMONAUTICS***

No 6, JUNE 1987

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## SOVIET UNION AVIATION & COSMONAUTICS

No 6, June 1987

[Except where indicated otherwise in the table of contents the following is a complete translation of the Russian-language monthly journal AVIATSIYA I KOSMONAVTIKA published in Moscow.]

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## GREATER DISCIPLINE, TRAINING FOR FLIGHT CONTROLLERS URGED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 6, Jun 87 (signed to press 30 Apr 87) pp 1-3

[Article by Col Gen Avn P. Belonozhko, first deputy chief of the Air Forces Main Staff and USSR honored military pilot: "Flight and Air Traffic Control Discipline"]

[Text] Summer flight training has commenced. The Air Forces personnel is carrying out difficult and responsible missions involving a rise in combat potential on the basis of retraining to modern aviation equipment, improving the organizational structure, flight and air traffic control. The establishing of a combat mood and the development of initiative and creativity among the aviators are being aided in every possible way by the restructuring of the training and indoctrinational process as well as by the widely developing socialist competition under the motto "We Will Carry Out the Decisions of the 27th CPSU Congress and Will Mark the 70th Anniversary of Great October by Unstinting Military Service!"

The desire of the aviators to go higher in their professional advancement and the high pace of combat and political training demand from the commanders, the staffs, the political bodies and the party organizations the introduction into practice of effective comprehensive preventive measures to ensure flight safety and to further strengthen flight, production and executive discipline in the units and subunits. It is not an easy thing to achieve high end results in combat training and the unconditional fulfillment of the planned flights. Along with certain positive experience in this work there still are substantial shortcomings which reduce its effectiveness as well as many unsolved problems. One of the main reasons for such a state is that certain party-member leaders of the aviation units and subunits underestimate the importance of personal responsibility for the quality of true command on the ground and in the air and for strengthening discipline as an essential condition in realizing the most important task of increasing combat readiness.

Well-organized, dynamic and safe flying depends largely upon skillful flight control and the correct organization of air traffic control as a whole.

Life has shown that the causes of flight accidents and, consequently, the violations of flight discipline are most often complacency, indifference, an

insufficient level of knowledge and a weakening of the sense of responsibility not only on the part of individual pilots, engineers and technicians but also specialists from the flight control group. In many of our units a great deal is being done to decisively eliminate such shortcomings. The commanders, staffs and political bodies, the party and Komsomol organizations steadily indoctrinate the aviators in a spirit of the prescribed requirements, efficiency and strict observance of the flying rules. Any mistake by the crew or flight controller is thoroughly analyzed and immediately measures are taken to exclude a repetition. Such analysis is carried out without fail at the general flight analysis in a regiment as well as in the course of the post-flight analysis in the squadrons, flights and other subunits.

Indoctrinating the flyers in a spirit of precise execution of the flight service rules is difficult work requiring great effort and a creative approach. For this reason all means which are available to the command and party organizations must be focused on shaping in each aviator a feeling of responsibility for strict observance of discipline, as well as scrupulous execution of the requirements of documents regulating flight service and ensuring flight safety.

The specialists of the flight control group (GRP) must show maximum attentiveness, high professional training, and the ability to act intelligently and efficiently under the conditions of an acute shortage of time and particularly in unusual situations. The GRP is the most important element in the direct air traffic control bodies. The duties of its officials are numerous, complicated and directly related to flight safety. A lack of discipline, any, even the slightest deviation from the flight service laws, and laxness directly or indirectly tell immediately on the quality of carrying out the flight assignments by the crews and entail dangerous consequences. For this reason, it is essential to pay closest attention to the moral-political, psychological and professional training of the flight controllers and instill in them the strong skills essential in all stages of control. Painstaking and effective work with this category of aviators is the guarantee for high organization and good results by each flight shift, each flight as well as the constant combat readiness of the aviation subunits and units.

A predominant majority of the flight controllers performs their duties as state interests and the provisions of the appropriate documents require. They are an example of discipline and efficiency, initiative and tenacity in implementing the combat training plans and in the daily struggle for high organization and effectiveness of the training process and vigilantly guard flight safety. There are many examples of the proper execution of their service duty by the GRP specialists. Here is one of them.

In the regiment which had initiated the socialist competition in the Air Forces military transport aviation and which until recently was under the command of Guards Col G. Kochergin, for a number of years there had been no flight accidents. In carrying out the most diverse assignments, the personnel always acted skillfully, precisely, enthusiastically and with a profound interest in stable end results.

The GRP specialists made a major contribution to this general success. For instance, take Guards Lt Col F. Slyusarenko. For more than 15 years he has been the TOE flight controller. He is marked by high professional training, the ability to quickly and carefully analyze incoming information, to ensure dependable and clear control of the crews in the air as well as correctly assess the actual combat skills of one or another pilot. In acting in strict accord with the requirements of the guidance documents, Lt Col Slyusarenko demands the same thing from his assistants. He trains and indoctrinates them in a spirit of mutual aid and mutual supervision, instilling such qualities as initiative and independence, high professional training and exactingness, organization and efficiency.

Unfortunately, there are also substantial shortcomings in the training and activities of the GRP as well as in the supervising of their work. The reasons for these vary. But, in analyzing flight accidents and potential accidents, it is essential to point out the main ones: violation of discipline of flight control, excessive self-confidence of the specialists in their work and at times their undertraining, negligence and indifference.

This is often apparent when the incorrect actions of the flight controllers follow the mistakes made by pilots. This is a very dangerous trend. There are numerous recommendations to prevent it. These must be carried out unflinchingly by everyone. An ignoring of the requirements of the documents governing flying and the nonobservance of safety measures inevitably lead to potential accidents and actual ones.

At one of the airfields, because of repairs on the runway, the aircraft took off from the main taxiway and landing was carried out on a dirt runway. Due to changes in the meteorological conditions, the flight commander decided to abort the flights. The deputy squadron commander, Maj B. Lobanov, who was preparing to take off, received the command to return to the parking area. Without permission from the flight controller, he began to taxi across the dirt runway. At the same time, the senior instructor pilot Maj V. Bogatyrev, after landing, having violated the instructions of the flight controller, did not release the brake parachute, the brakes were used ineffectively and the aircraft rolled to the end of the strip. As a result the two aircraft collided. And this was during the daytime, with virtually unlimited visibility!

Who was to blame? It is difficult to answer this question categorically. This was precisely a situation when the lack of discipline by the pilots combined with violations in flight control led to precisely such serious consequences.

In the existing situation, the TOE flight controller, Maj V. Medvedev, did not direct the fighter traffic on the ground and did not observe the flight planning table. And his assistant who was next to him for some reason did not provide complete supervision over the procedures on the flight field.

On similar episode. In one of the Air Forces units there was an infrequent instance of laxness and irresponsibility by the TOE flight controller and this led to a dangerous potential flight accident. Lt Col P. Zubets permitted a

young pilot to taxi onto the runway for taking off while at the same time another was coming in to the runway. The near zone flight controller, without knowing the situation on the runway, permitted landing after receiving the report that the wheels were down. Lt Col Zubets at this time was engaged in a telephone conversation on other matters and had forgotten the combat aircraft which had taxied onto the runway. The pilot coming in for the landing, contrary to common sense, decided to land ahead of the aircraft on the runway. As a result, aviation equipment was damaged.

All of this occurred in front of the very eyes of the GRP some 200 m from the control tower [KDP]. However, here again the blame of the pilots was obvious. They should have been more circumspect both in the air and on the ground and have a better idea of their position and the location of other aircraft in the airspace.

The dangerous situation would not have arisen if the flight shift had been well organized. In the work practices of leading units, during the flight period all telephones are disconnected with the exception of a direct line to the command post. Here is something for other commanders to think about.

A formal approach to resolving questions of training personnel for the GRP can still be seen in the activities of individual commanders, political workers and party organizations. Basically only this can explain the fact that due to the fault of the GRP the flight shifts are in some places carried out on a low organizational and procedural level, in a situation of nervousness, confusion and end with unsatisfactory results.

This is also confirmed by the following actions. A flight controller, in fearing to irritate a superior, endeavors to give him fewer commands, he directs the crew without confidence and relies basically on the pilot's experience. This is unacceptable! The flight controller is the solely-responsible and fully-empowered master in air traffic control within the area of his airfield. The carrying out of his commands, instructions and orders is obligatory for everyone, regardless of the position held by the pilot.

Unfortunately, the authority of the flight controller is not always supported by the commanders themselves. This happened recently at one of the units where Lt Col V. Popov, in approaching for a landing under minimum weather conditions, made an error preventing the aircraft from landing at the center of the runway and did not think it necessary to carry out the command of the flight controller to make a second circle. As a result the aircraft landed on the edge of the runway, it ran off into the ground and sustained significant damage.

Such "independence" on the part of the commander and superiors in the air, and the negligent and poor performance of functional duties by the GRP and traffic control bodies cause only harm to flying.

The specialists involved in controlling a flight shift should be constantly ready to take optimum decisions. For this reason it is essential to be concerned specifically and effectively with their early, preliminary and preflight training. This is the direct path to increasing the level of

knowledge of the GRP officials as well as for improving the quality and efficiency of flight training.

Here it is very important to employ the trainer equipment which is available to the aviation units. This includes: training classrooms with modern equipment simulating the operation of control posts, the regular equipment of command posts, traffic control towers, the RSP [landing system controller] as well as the various specialized and integrated systems. Drills which are organized correctly from the educational standpoint at these make it possible to gain the necessary skills in a short period of time and with minimal material outlays.

We must particularly emphasize the importance of commander supervision and a principled approach to each GRP specialist for his readiness to control the flight shift. Here the main thing is to prevent from access to control the persons who do not have sufficient skills and do not know the specific tasks of the forthcoming flights.

Experience confirms that discipline over flight control is observed more strictly and there are fewer mistakes in those units where the regimental commanders and the chiefs of staff are personally concerned with the training of the GRP. Such controllers not only show exactingness but by their personal example instill in the aviators a desire to carry out the set tasks well. Thus, there is a comprehensive approach to ensuring flight safety.

The rapid change in the situation, the diversity of information coming in over different communications channels and the necessity of taking complex and crucial decisions--all of this increases the psychological stress on the GRP officials. And this can be endured only by a person with high discipline, mental resourcefulness, professional preparation, physical conditioning and strong willpower.

The maintaining of high work efficiency and circumspection in the process of controlling is aided by the correct alternating, where this is possible, of working and time off for the specialists during the flight shift. For example, a well-prepared command post officer successfully handles the control of several targets for a period of 40-45 minutes of work. After this, he should be provided with 10-15 minutes of rest. This certainly must be considered in compiling the planning table. Such an approach to organizing the work of the specialists also helps them avoid errors.

The air unit staff plays a major role in correctly organizing flight control and in the professional growth of the GRP crews. On the day of preliminary preparations, its chief personally as well as through subordinate officers and the corresponding services, in carrying out the commander's decision, must work out the requests for the flights and their support with control equipment. He organizes the preparations and supervises the use of the training facilities, he monitors the holding of exercises with the GRP officials as well as their independent preparations and drills, he systematizes data on the degree of readiness of the men and weapons to control the flights and reports this to the commander. During the period of preflight preparations and during the flights, the unit staff without fail must inspect



the activities of the control group as well as the operating of the control equipment for the flight shift.

Discipline in flight controlling depends largely also upon the level of party political work with the GRP personnel. They proceed correctly where the political workers, the party and Komsomol activists pay close attention to the professional preparedness and the personal responsibility of these specialists for ensuring safe flight control. It is essential everywhere to work for a greater role to be played by the procedural councils of the units so that the questions of flight discipline, airfield-technical support and the state of communications and the radio equipment are discussed regularly at their sessions.

It is essential to increase the administrative and party exactingness for persons whose official duty it is to be constantly concerned with flight safety as well as strengthen the demands placed on those who make mistakes, who do not show proper endeavor, have a negligent attitude toward performing their functional duties, do not assess their activities self-critically and do not seek out ways for effectively improving the state of affairs in the assigned job.

The forms and methods of fighting to strengthen discipline in flight control are diverse. These include individual talks, the exchange of advanced experience, detailed analysis of the actions of the GRP officials in each specific instance, a comradely aid from the more experienced officers to the young specialists, the hearing of reports by party and Komsomol members in the party and Komsomol organizations concerning ideological-theoretical and professional development, the observance of the flight control rules and much else.

An offensive, principled struggle for discipline in flight leadership combined with the commending of initiative and creativity of the GRP personnel will contribute to the further effective growth of the combat potential of the Air Forces to a higher quality training and indoctrinational process as well as safe flying.

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## BETTER COORDINATION OF GROUND, AIR FIGHTER CONTROL SOUGHT

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 6, Jun 87 (signed to press 30 Apr 87) pp 4-5

[Article by Col I. Kuzmenko, military sniper pilot: "For Skillful Combat Leadership"]

[Text] In the course of the tactical flight exercise, the group of Maj P. Kovalchuk was given the task of destroying "enemy" fighters in a deliberate air battle. The evening before the aviators planned several variations of the air battle and they worked out their actions by the "walking through" method considering their aggressiveness and the seizing of initiative in the air which, as is known, is the guarantee for victory over the enemy. The combat control officers also participated in preparing the crews for the tactical flight exercise. Seemingly everything had been considered down to the last detail....

Then upon command from the command post, the missile-carrying aircraft took to the skies. The group reached the designated area at the assigned altitude. The combat control officer, Capt V. Marchuk, promptly spotted the "enemy" aircraft and informed the group leader of this. Having received exhaustive information from the command post concerning the nature of the target, altitude and distance to it, Maj P. Kovalchuk at the set distance to the "enemy," gave the command to his wingmen:

"Three hundred twenty-five, version one."

This meant that he, having assessed the situation, had taken a decision to conduct air combat according to the version which envisaged disengaging in the group. And although the forthcoming actions had been agreed upon on the ground, the group of Maj Kovalchuk, unfortunately, did not maintain the established time in the disengagement. As a result, its battle formation did not conform to the battle plan.

The combat control officer from the plan-position indicator saw that combat was not turning out in favor of the fighters. By his intervention he could have helped the crews get a better understanding of the situation. However, V. Marchuk remained in the role of an indifferent outside observer. Tactical cooperation in the group was lost. The leader controlled the wingmen without

having any idea as to their position in the group. As a result, a pair of "enemy" fighters unimpeded attacked the second pair of the group and disengaged with impunity.

The passivity of the combat control officer, Capt V. Marchuk, the failure to maintain the battle plan and the unskilled control of subordinates by Maj P. Kovalchuk led to a situation where the mission was not carried out.

To the honor of the collective, here they were able to draw correct conclusions. Having analyzed in detail the reasons for what happened, the unit concluded that the existing method for training the combat crews of the command post and the direction post did not always provide high quality fighter control in combat and for this reason required further improving.

The restructuring in the collective began by introducing a method of modeling crew control into the work practices. According to this method, the combat crews of the command post, having received the task for the flights, worked out the procedure for their forthcoming activities ahead of time in a detailed and scrupulous manner and analyzed various nonstandard situations which might arise in the course of the duel between the fighters.

The squadrons began to show a serious attitude toward playing through air combat using the "walk-through" method and which they previously viewed as an anachronism which was profoundly wrong. Practice shows that the working through of versions of air combat employing this method is particularly essential in carrying out group air battles. Such exercises provide an opportunity for the combat control officer to visualize the battle formations of the various tactical groups, their echeloning and the methods of coming in for the attack observing safety measures and the procedure of tactical and fire cooperation between the groups. The value of the given modeling method is also that it is accessible in any practical situation and brings tangible benefit both to the command post personnel and to the flight personnel.

I would like to particularly emphasize the following. The tactical group commanders control the fighters in the air on the basis of a combat plan worked out before the sortie and this is adjusted by them depending upon the developing situation as well as upon information from the crews and the ground control posts. Here the group leader should ahead of time assess the new situational elements which may be known to him even before the start of combat. These include the probable headings, altitude and speed of flight of the "enemy" aircraft, the conformity of his own battle formation to the newly developing situations, the meteorological situation in the combat area and its influence upon the carrying out of the set task, the sun's position, the distance of the group from the airfield and the remaining fuel, the presence of radio interference on the control channels and so forth.

It must be remembered that the task for air combat must be clarified and the decision taken by the time the group reaches the initial position for the attack. Let me give an example from combat training experience to confirm this.



In a tactical flight exercise, the squadron commander gave the group of Capt V. Orlov the task of covering ground subunits against air attack. The fighters were in the patrol area when the "enemy" attempted to attack the targets. The combat control officer, Capt A. Kuznetsov, promptly detected the "enemy" aircraft and brought the fighters in for an attack from the forward hemisphere. The group leader commenced to carry out the attack. Just a few seconds remained before the firing of the missiles. However, at the last moment, the bombers quickly broke up formation and attempted to seize the initiative in combat.

The regiment's commander directing the crews from the command post had an instant to assess the situation and take a decision in the given circumstances. Having quickly and intelligently analyzed the "enemy's" actions and guessed its intentions, the officer commanded the leader to destroy the "enemy" attack group and ordered the combat control officer to monitor the actions of its feint group.

Capt A. Kuznetsov promptly informed the leader of the fighters about the "enemy's" maneuver. Having correctly understood the rather contradictory situation, Capt V. Orlov commanded his wingmen to maneuver to attack the attack group. All the pilots acted intelligently and precisely. The assignment was carried out excellently. Here is what it means to skillfully control combat from the ground and in the air.

The combat training of the aviators persuades one that the problem of controlling air combat at present remains very acute as before. The aviation units are receiving airplanes the equipment of which helps to successfully carry out tasks in a diverse tactical situation. However, the excellent capabilities of the equipment at times remain not completely realized due to the poor organization of the training process. At the same time, time passes and costly equipment becomes obsolete...and most importantly, the quality of combat training suffers.

If this is viewed in the context of the restructuring being carried out in the nation, then the following must be pointed out. An analysis of the effectiveness of the forces involved in combat control indicates that here we must solve a number of serious problems. For example, there has long been a need to intensify the exercises and the tactical flight exercises, particularly for the combat control specialists. It is essential to see to it that they meet the conditions of fighter combat by having the innovators introduce technically advanced control systems and employ effective forms and methods of work by the specialists as well as the crews in using the existing equipment and systems for controlling combat.

In addition, the pilots have a pressing need for universal trainers to carry out operational-tactical tasks. These can be successfully employed for the stricter and more precise simulating of combat control, in playing through ahead of time various scenarios for clashes with the "enemy" and by changing the make-up of the tactical groups and so forth. The realization of this, undoubtedly, will help to raise the level of the operational and tactical thinking of the air commanders and develop skills in simulating fighter

control in combat both for the flight personnel as well as the crews of the command posts.

As we can see, the problems confronting us are not easy. We are simply unable to resolve a portion of them by our own forces. Obviously efforts in this area must be coordinated with the superior staffs. Time is of the essence!

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## DANGER OF PREMATURE OPENING OF BRAKE PARACHUTE DESCRIBED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 6, Jun 87 (signed to press 30 Apr 87) pp 5-6

[Article, published under the heading "For the Pilot on Practical Aerodynamics," by Col G. Rayevskiy, candidate of technical sciences and docent: "A Rare But Dangerous Case"]

[Text] The accidental release of the brake parachute is an exceptionally rare phenomenon but a completely possible one. The cause of this can be shortcomings in readying the aircraft for the sortie as well as mistaken actions by the pilot involving the cockpit equipment.

The release of the brake parachute on take-off is undoubtedly a dangerous phenomenon but the take-off, as a rule, ends safely, as the parachute is quickly burned up by the afterburner flames and the crew has merely to free the remnants of the parachute. If the brake parachute is released during the first half of the take-off run there is usually enough runway length left to abort the take-off and halt the aircraft on the runway.

With the accidental release of the brake parachute in aerobatics in a zone, under the effect of the velocity head the cable snaps and there are no particular complications. Most dangerous is the accidental release of the brake parachute in the landing descent, when the pilot is busy maintaining the landing approach. The slight altitude margin and the rapid and irreversible loss of speed cause a series of exacerbating circumstances.

A fighter passes the outer marker in approaching a landing from circling at an altitude of 240-250 m and a speed of 380 km an hour. At a certain distance from the outer marker radio beacon with a speed of flight of 360 km an hour, the SPS [expansion unknown] system is automatically activated. At first glance, the release of the brake parachute after passing the marker at such a speed is not dangerous because the cable should break instantaneously because of exceeding the design strength of the cable. The short effective time of even the great braking force does not lead to a substantial change in speed and loss of altitude. Nevertheless, there have been instances in flight practice when the brake parachute did not snap off at a speed of 360 km an hour.

The crew of a fighter trainer was preparing for a flight. A new, untested brake parachute had been packed in the container and the locks closed. The technician reported that the aircraft was ready for the flight. The crew executed the take-off and began to carry out the assignment in the zone. The equipment worked flawlessly. In returning to the airfield, the pilot lowered the wheels and flaps. The outer marker was passed. At a speed of 360 km an hour, the SPS system was activated.

When about 2.5 km remained to the runway, the pilots felt a sharp jolt as the brake parachute had been released. This caused a significant drop in speed and strong pitching-up. The longitudinal g-load almost instantaneously increased to  $-1.4...-1.5$ . It must be said that an abrupt change in the longitudinal g-load always has a significant physical and psychological effect on a man, particularly if this has a negative sign as the impression is created that the aircraft had run into an obstacle in the air. The pilot is abruptly thrown forward, work position and coordination of movements are disrupted.

The reason for the drop in speed with the release of the brake parachute is understandable to anyone, although the quantitative characteristics of this are not understood sufficiently fully by many pilots. Calculations show that at a speed of 360 km per hour, the aerodynamic force of the parachute  $R_{bp} = 8,500-9,000$  kg. In the landing descent, engine speed equals 80-85 percent, thrust  $P_e = 1,600-1,900$  kg, while the aircraft's own drag was approximately 1,900 kg.

The amount of brake acceleration is calculated by the formula:

$$j_{x_b} = \frac{g}{G} (P - X - R_{bp}).$$

Substituting the figures with the known weight of the aircraft, we receive an acceleration in braking equal to 10-15 m per sq second. This means that in just the first second, aircraft speed is reduced by approximately 45 km per hour. Subsequently, its rate of drop declines. However, it requires 2 or 3 seconds to assess the situation and during this time speed will decline by 80-90 km an hour. It also takes time to free the brake parachute. Thus, in the 3 or 4 seconds the aircraft's speed will drop to 240-230 km an hour. If it is assumed that the flight personnel has been trained for actions under such circumstances, still from the start of the release of the brake parachute to its dropping some 3 or 4 seconds will pass and speed will drop to 270-250 km an hour.

In running on three wheels and in the absence of thrust, the brake parachute is set by the air flow created by the air flow, creating a pitching moment, since the point of attachment of the brake parachute is located above the center of gravity. In the area of the outer marker, an aircraft is dropping at angles of attack of 5-6 degrees and in activating the SPS system, the angle of attack drops to 2 degrees.

While with angles of attack of 6-7 degrees, the line of aerodynamic force  $R_{bp}$  passes through the center of gravity or close to it, with  $\alpha = 4$  degrees, it runs significantly above the center of gravity of the aircraft and because

of this a pitching moment is created. It must also be considered that with an engine speed of 80-85 percent the exhaust jet holds the brake parachute in the blast of the jet nozzle. This leads to an increased arm between the airplane's center of gravity and the force line of  $R_{bp}$  and this causes an additional increase in the pitching moment. Consequently, with the release of the brake parachute in a descent, a very powerful pitching moment occurs.

It is very difficult to parry this by pushing the stick away from oneself, as because of the rapid decline in speed, the tailplane loses its effectiveness and the pitching moment from the parachute substantially exceeds the pitching moment of the tailplane.

With an increase in the angle of attack, the brake parachute, in being set by the flow at  $\alpha > 6$  degrees, should create a nose-down moment proportional to the increase in the angle of attack. Hence, initially the release of the brake parachute creates a pitching-up moment to increase the angle of attack and this very quickly is replaced by a large nose-down moment. Moving the stabilizer to balance the aircraft in the required position is not sufficient.

Increasing engine speed to a maximum (this requires 3 or 4 seconds) also does not provide the needed effect. This is due to the fact that at a speed of 300-360 km an hour, engine thrust is still significantly less than the brake parachute's drag and if the parachute is in the current of the jet nozzle, under the effect of the engine jet it plays the role of a reversing device and reinforces the decline in speed.

Let us examine the behavior of an aircraft and the actions of the crew with the release of the brake parachute following the recordings on the film of the SARPP [aircraft automatic flight parameter recorder]. In the initial position, the aircraft is at an altitude of 150-180 m, a distance of 2.6 km from the runway. The speed of flight is 360 km per hour. The SPS system has been switched on as can be seen from the reduction in the angle of attack from 6 to 4 degrees. The release of the brake parachute caused a rapid increase in the angle of attack to 11 degrees in a second. On the SARPP film one can see the abrupt drop in speed at the moment of activating the brake parachute. The aircraft crew instantaneously parried the increase in the angle of attack by pushing the stick forward to the limit and the abrupt braking of the aircraft by increasing engine speed.

Regardless of the energetic drop in speed, due to the increase in the normal g-load, the aircraft moved from a descent into a climb with a slight angle with a subsequent drop. On the film one can notice a small increase in the normal g-load a half-second after the release of the parachute. The effect of the g-load  $n_y > 1$ , as is shown from the calculations and the recording on the SARPP film, lasted around 3 seconds during which the aircraft moved from a descent to horizontal flight and then into a climb with a subsequent drop.

Although the speed of flight was low, the lift could not equalize the aircraft's force of gravity and altitude declined relatively slowly, both due to the high angles of attack as well as due to the engine jet lift component which equaled 1,000-1,200 kg.

Engine speed over the 4.5 seconds increased from 83 to 100 percent and here speed continued to drop under the effect of the great drag and reversing effect of the brake parachute. As can be seen from the diagram [not reproduced], over time this dropped and was due to the drop in speed, but remained more than the engine thrust.

The increased engine thrust with greater speed and a higher angle of attack caused the appearance of additional lift in the air intake and this also increased the pitching moment. On the SARPP film, one can see how the air stream tried to break the brake parachute out of the engine blast. And in actuality, at certain moments it partially escaped from it. The angle of attack dropped from 18 degrees to 15 degrees and then increased and decreased and only with  $\alpha = 36$  degrees did the air stream pull the parachute from the engine blast. Over a period of 2 seconds, the angle of attack dropped to 3 degrees. At this moment, the parachute was released by the pilot after which the pilot continued to decline as the speed of flight was around 200 km an hour (stall conditions).

In this extremely complicated situation, the pilot held the stick forward for around 6 seconds and on the 7th second "dropped" it, having realized the futility of combating the pitching moment using the tailplane. The released stick, having made a slight oscillating movement, positioned itself at trim ( $\phi_{st} = +4$  degrees).

Thus, 6 seconds went to assess the situation during which the crew endeavored to parry the increase in the angle of attack and pitch and halt the drop in speed. Having realized that the cause of such behavior by the aircraft was the brake parachute, the pilot dropped it. Subsequently, the pilot's actions were correct and the flight ended safely.

If the brake parachute, with the increase in the angle of attack and the comparatively slow engine speed, had immediately broken out of the engine blast and created a significant nose-down moment, then the aircraft virtually instantaneously would have gone into a steep dive and it would have been extremely difficult to bring it out. Even the probability of a safe bailing out in this instance would be reduced due to the loss of time in taking the decision and the increase in the height of a safe bail-out considering the progressive growth of vertical speed. Thus, with the unintentional release of the brake parachute on the landing approach after passing the outer marker, the clearest and most decisive actions are essential even to the point of the immediate escape from the aircraft. Serious preparations for such conduct in the air is required on the ground considering the particular features of the type of aircraft employed in the unit, the conditions for the landing approach, the specific margin of altitude and speed of flight at the moment when such a rare but dangerous incident occurred.

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#### GREATER SECURITY, DISCIPLINE IN GUARD DETAIL DESCRIBED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 6, Jun 87 (signed to press 30 Apr 87) p 7

[Article, published under the heading "The Strength of the Army Lies in Discipline," by Lt Col N. Starunov, chief of staff of a helicopter regiment: "At the Parking Area After the Flight Operations Shift"]

[Text] The regular flight operations shift was over. The airfield was empty. The officer on duty for the unit parking area, Capt G. Mashchenko, walked around the helicopters, and inspected the airfield structures closely. Everything was in order. However, the officer, having summoned the dutyman for the subunit parking area, WO ["praporshchik"] L. Kanyuk, ordered him to recheck whether the containers with equipment, the squadron huts and the combat equipment had been well closed and sealed and how the facility had been prepared to turn over to the guard for protection. He instructed his assistant, WO V. Yemelyanov, to supervise the readiness of the subunits as well as draw up the appropriate documents.

While his subordinates were carrying out his orders, Capt Mashchenko checked the presence of the seals, map cases and keys. The dutyman soon reported that the parking areas had been turned over to the guards for protection. The officer again made certain whether the dutyman for the subunit parking areas knew their duties and then reminded them of the service procedures and clarified the time for the opening up of the parking areas. After this he reported to the unit duty officer and inquired whether the dispatcher had any requests for flights or not.

At first glance, there was nothing difficult or unusual in the duties of the duty officer for the unit parking area. But it was not as simple as it seemed. This detail is very responsible, since the duty officer in the absence of the commander has full authority at the parking areas of the combat equipment and all surprise inputs must be solved primarily by him. For this it is essential to possess definite knowledge and skills. With good reason painstaking preparatory work precedes the going on duty.

In preparing for the detail, Capt G. Mashchenko carefully studied all the questions involved in organizing and standing duty, he clarified the allotment of battle tasks for the subunits and the use of the aviation equipment. The



officer gave special attention to the security and defense of the airfield. In using a mock-up of the airfield, with his subordinates he worked through such questions as repelling an enemy assault force, the defense of the fuel, lubricants and ammunition dumps, the procedure for moving aviation equipment from under attack and others.

Once I happened to be present at an exercise involving the squadron chief of staff, Capt N. Gugolko, the subunit deputy commander for the IAS [airfield engineer service], Capt V. Tereshchenko, and Capt G. Mashchenko who were preparing to go on duty.

"Solve this input," said Capt Gugolko to Mashchenko. "A diversionary group is advancing toward the fuel and lubricant dump from the forest. What would your actions be?..."

Capt Mashchenko using the established alert warned the chief of the guard and the regiment's duty officer of the appearance of the "enemy" and using the intercom warned the dutymen for the subunit parking areas of this. All of this took just a few seconds. Soon duty vehicle brought reinforcements from the guardhouse. The "attack" was successfully repelled.

In the meanwhile the chief of staff gave a new task: "The command has been received for the PSS [expansion unknown] crews to take off." And again efficient actions followed. There could be no doubt that the duty officer for the unit parking area kept his head in a difficult situation.

Without exaggeration I can say that Capt Mashchenko is one of the best prepared officers in the unit. He has down pat the particular features of alerting the personnel, the procedure for receiving alerts and monitoring the state of camouflage as well as the fire safety rules. The officer kept close track on the observance of pass conditions, the motor traffic routes on the airfield and executive discipline.

Sr Lt V. Zadorozhnyy has been serving for a little more than 2 years in our unit. Over this time, the officer has proven to be a good specialist who conscientiously performs the duties entrusted to him, including during service on detail. The officer's serious preparations for going on duty contributes largely to this. For a conscientious attitude toward the assigned job, for efficiency and initiative shown in the daily details, Sr Lt Zadorozhnyy has been repeatedly commended by the regiment's command.

Seemingly it would not be a great difficulty to learn the appropriate instructions completely. In actuality it is not hard to study the documents but to act in accord with their demands is beyond some. In preparing to go on duty, certain officers forget that this is a combat task and hence it must be carried out with all responsibility. Some of our officers lack this quality.

Cpts I. Pustovit and V. Tarasov repeatedly made oversights in standing daily detail. These officers are experienced, well-trained air specialists who must simply be an example for the youth. Nevertheless, on duty they do not endeavor to fully utilize their rich service experience. Frankly speaking,



the violations committed by these officers are the result of elementary inefficiency and unconscientiousness.

This shows that we have weak points in organizing troop service and in preparing the men to perform their obligations while on duty. At present, the subunits are working to strengthen discipline and increase the responsibility of persons going on duty. This is seen as an important component element in further increasing the unit's combat readiness.

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## RESTRUCTURING PROBLEMS IN AIR FORCE IDEOLOGICAL WORK EXAMINED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 6, Jun 87 (signed to press 30 Apr 87) pp 8-9

[Article, published under the heading "Decisions of the 27th CPSU Congress in Life" by Maj Gen Avn V. Makeyev, chief of the Agitation and Propaganda Section and deputy chief of the Air Forces Political Directorate: "Ideological Work: A Time of Reorganization"]

[Text] At present, major changes are occurring in the Air Forces as throughout the nation and positive trends are appearing and gaining strength. The Air Forces personnel totally, in mind and spirit, approve the strategy of acceleration and the ways of realizing it as elaborated by the 27th CPSU Congress and the January (1987) Central Committee Plenum as well as the party's practical activities aimed at implementing the designated course. But time does not wait. The time to act has come.

The answer to the question concerning the aims of the reorganization in ideological work was clearly formulated by the January (1987) Central Committee Plenum. The report of the General Secretary of the CPSU Central Committee, Comrade M.S. Gorbachev, emphasized: "In initiating a struggle to improve society, the party from the very outset has proceeded and does proceed from the fact that a sound foundation of conviction must underlie this enormous work." For this it is essential to have, to put it figuratively, a mechanism of ideological action which would effectively and purposefully influence the awareness of each individual, public opinion, in providing a profound understanding of party policy, the tasks posed by the party and the ways for carrying them out and developing in people a vital interest in changes and a need for energetic actions. To have a perfected "mechanism" for ideological work is the most important aim in its reorganization.

In a number of the Air Forces collectives, a rather ordered system of ideological work has come into being and is in operation. In the political bodies, units and subunits there are numerous experienced and well-regarded propagandists who are actually demonstrating their ability to work under the conditions of restructuring. Among them are the Officers N. Buyanov, G. Smeshkov, Yu. Gogolev, V. Bobrov, G. Pechkarev and many others.

Regardless of definite positive shifts, it would be premature to assert that at present this task has been achieved and a system for effective and day-by-day influence on the awareness of the military aviators has been organized in all the Air Forces units. The political knowledge of individual officers, warrant officers ["praporshchik"], sergeants and soldiers is frequently superficial and is not reflected in the specific areas of their service activities. There has not been a decisive shift in the social awareness, the psychology, thinking and attitudes of the servicemen.

We have numerous instances when aviators have not noted shortcomings in their work or conduct or do not see these in their comrades, and all the problems existing and arising in the subunit, unit or even the formation, are linked to so-called "objective conditions" to some miscalculations and unfinished business, referring the solution to these problems solely to superior levels.

Ideological work in the Air Forces line units as well as in the VUZes at times is carried out without considering numerous factors (service, social, routine and so forth), the age, education and professional training level of the various personnel categories and the moral microclimate in the troop collectives. All these particular features are in no way reflected either in the content or forms of work. The avoidance of acute questions, the fear of dialogue and polemics and the substituting of directive instructions or one or two individual measures of a general nature for extended and painstaking work with the personnel--such an approach is still no rarity in the practice of ideological and political indoctrination.

At times, the propaganda and agitation and the cultural educational work lack argumentiveness, freshness of thought and clarity of exposition, aptness and passion. Routine, the dull reading of texts, the inability to master the word and lead a discussion--all of these are far from extinct phenomena which nullify the expended forces and time and block the path of ideas to the hearts and reason of the military aviators. The effectiveness of the indoctrinational, mobilizing effect on the personnel has been substantially reduced by the surviving priority of mass measures carried out, as a rule, on the regimental level. These do not make it possible to "reach out" to different categories of servicemen, specific collectives and individual organizations. Without in any way denying the mass forms of work, we should caution the ideological aktiv against over-involvement with these at the expense of a differentiated approach and individual work.

Formalism also greatly paralyzes the system of ideological work. Its manifestations vary but there is a single essence, that is, the measures are for "show" and not for the sake of the effect on the awareness and feelings of the personnel.

There are many bottlenecks in the very organization of ideological work, starting from determining its overall concept and goals for the short and long run, the choice of means and the allocation of forces, the objectivity of information and analysis of its state and ending with the summing up of results and the elaborating of measures for further progress. This is also one of the reasons for its insufficient effectiveness.

In carrying out the complicated and responsible tasks set by the 27th Party Congress and by the subsequent plenums of the CPSU Central Committee in the sphere of ideological work, it is essential that the Air Forces commanders, political bodies, party and Komsomol organizations focus attention on the reorganizing of primarily its main areas: the shaping in the military aviators of a communist conviction, political sophistication, and the strengthening of the ideological and theoretical conditioning of the military personnel as the prime basis of ideological indoctrination. Immeasurably greater prominence must be given to propagandizing honest, creative and enterprising military service and to the labor and military indoctrination of the personnel.

The broad range of tasks of an international nature carried out by the Air Forces as well as the multinational composition of the aviation collectives require constant improvement in patriotic and international indoctrination. The activities of the ideological cadres in the area of moral, legal and atheistic indoctrination and in conducting counterpropaganda need substantial improving.

Openness [glasnost] serves as an effective weapon in combating the manifestations of alien ideology and morality and negative phenomena. Our propaganda and agitation possess everything necessary to make it that sword which, in the apt expression of V.I. Lenin, "itself heals the wounds caused by it." At times under army conditions this weapon is employed timidly and overcautiously.

This is the frame of the edifice of ideological work in the course of its reorganization. All these areas have been formulated in the new version of the CPSU Program and thus serve as a party law.

However, this is not the end of the reorganization. Propaganda and agitation, cultural educational work in the Air Forces should actively and effectively support the reorganization in all spheres of activity of the commanders, the political bodies, the staffs, party and Komsomol organizations and each military aviator. It is our common task to skillfully reflect the party line, the ways and methods of carrying it out in the work of all the leading bodies, organizations, officials and troop collectives and shape the attitude of people to carrying out the tasks of combat and political training and to carrying out the socialist obligations as a whole, that is, the problems of the further development and strengthening of the Air Forces as their vital concern. This, in essence, is what is involved in the ideological support for the activities of the aviators aimed at further increasing combat readiness, air and operational-tactical skills, ensuring flight safety and strengthening military discipline.

Life itself and the reorganization urgently require that we learn to work in a new manner and comprehensively carry out the set tasks, considering here their political, ideological and other aspects. In line with this I would like to share certain ideas on the ways and methods of improving ideological support for the activities of the Air Forces personnel in further increasing the combat readiness of the units and subunits, improving the quality of combat training and flight safety.

In recent years, major qualitative changes have occurred in the Air Forces. However, ideological work has often been carried out by the old methods. For this reason a key task for the political bodies and party organizations is to bring this into accord with the demands of the time and the current stage in the development of the Air Forces. In particular, our political workers and the ideological aktiv must be concerned with working out new models of ideological work during the period of the reorganization, bearing in mind that these models should cover each category of aviators as well as all spheres of their service and social activities.

It is important to clearly fix a course of steadfastly overcoming in the minds and practical activities of the command-political and engineer-technical personnel of oversimplification, laxness and negligence in combat training. The principle of "teach the troops what is essential in a war" has been and remains the determining thing in the training and indoctrination of the aviators.

The closest attention should be given to ideological support for the struggle for a fundamental improvement in military discipline, particularly to irradicate improper relations and other negative phenomena in the forming and development of the aviation collectives. Here each ideological worker must determine his place and his own active role.

The CPSU Central Committee is demanding an actual shift of emphasis in the style of party leadership to active work in the masses, to organizing the actual fulfillment of the adopted decisions and intended plans, the supporting of initiative and the commending of innovative search. From this derives for us the primary task of focusing our main efforts on the ideological and political indoctrination of the men directly at the airfields, the parking areas, in the TECH [maintenance units] and in the crews of the airplanes and helicopters. The ideological work should be conducted not generally but in terms of time and place, the specific situation and the tasks. In order to bring this about it is essential to have a good knowledge of both the tasks, the conditions, the particular features of carrying them out, that is, to be competent on all questions of the combat training of the flight and engineer-technical personnel.

This must be remembered since at present individual propagandists are still encountered who feel that they are not obliged to know the aviation equipment and weapons, the Air Forces tactics and the requirements of the guiding documents on the organization of combat training and flying. This is a deeply erroneous and harmful opinion! If a propagandist, in speaking with the pilots and aviation specialists, has only a general notion of what they are concerned with at a given time, his words remain only an empty phrase.

It is time, finally, for everyone to realize that in aviation incompetence is paid for at a high price. And the indoctrinator, whoever he be in position or specialty, must have a profound understanding of the equipment and tactics as well as all details of the aviation laws, rules and traditions. Each ideological worker should have a good knowledge of the field manuals, the

current orders, instructions, regulations and directives which govern combat training, flight training and other spheres of activity of the Air Forces personnel. Practice has also confirmed the necessity of retraining non-flying political workers for the new equipment as well as the systematic adding to and updating of their knowledge.

At the same time, it is essential to further increase the activity and purposefulness of the agitation-propaganda groups and collectives as well as well as the volunteer lecture groups in mobilizing the aviators to thoroughly study and master modern combat equipment and weapons as well as in propagandizing military technical knowledge. Considering the ever-growing complexity of military service for the aviation specialists and the demands placed on them, it is important to strengthen the role of oral propaganda and visual agitation in increasing professional skills of the engineer and technical personnel.

The new aviation equipment requires a qualitative new level of thinking and a reform in the psychology of the aviators. However, what has changed, for example, in the moral-political and psychological training of flight personnel? We must work more on establishing in each aviation collective modern, specialized classrooms and procedural labs as well as rooms for mobilization and psychological relaxation. We must have general and particular methods of moral-psychological training in relation to the individual types of combat and flight training considering all factors the influence of which the pilot actually feels (or can feel) in carrying out an assignment on a certain type of aircraft or helicopter. The members of the moral-psychological training sections of the procedural councils must set up a system of psychological analysis of flight accidents and near misses. The conclusions from such analysis, particularly those pointing to the repetition of errors, must be made available to all the personnel without fail.

Numerous shortcomings in the moral-psychological training of aviators are tied to the underestimation of the importance of the individual approach. For instance, some 10 or 15 years ago in long-range aviation they widely employed cards showing the individual psychological features of the flight personnel. Unfortunately, over time this experiment was forgotten. We must return to it and adopt all that is better and useful. We must keep a special card for professional psychological study for each pilot or navigator. This should be incorporated in the officer's personal file and filled out upon graduation from school, annually over a period of 3 years after finishing school and then once every 3 years; in addition, with the transfer of the pilot to another unit, his retraining for new aviation equipment, in the event of a flight accident or dangerous near-miss due to his personal fault. The commanders and political workers must carefully study and conscientiously keep such cards. We feel that the procedural councils of the units should also be involved in this work.

In carrying out the party program tenet of developing socialist democracy, it is important in every possible way to activate the work of the volunteer organizations of the aviation units, the VUZes and institutions and develop



democracy in the activities of the officer meetings, the comrade courts of honor, the warrant officer councils and the general meetings of servicemen. It is essential to increase the role of the women's councils not only in the ideological-political and moral indoctrination of the aviator family members but also in combating domestic drunkenness and violations of preflight conditions and for establishing a health moral atmosphere in the serviceman families. For this it is essential to improve the ties of the women's councils with the command (up to the squadron and flight), with the political bodies, the medical and other services.

To put it briefly, whatever areas of points of emphasis in ideological work we examine, today we need everywhere not words but concrete deeds.

This applies fully to the forms and methods of activity of the ideological cadres. The aviators frequently ask whether the forms of propaganda and agitation and cultural education will change? It is a reasonable question. In actuality, individual forms have not provided a proper effect. And we must abandon what is hopelessly out of date and not suitable under the new conditions. However, is form always the guilty party in the low return from ideological efforts? We feel it is not. For example, the experience of organizing and conducting party political work with the aviators in the limited Soviet troop contingent in Afghanistan as well as participants in eliminating the disaster at the Chernobyl Nuclear Plant showed that all the basic forms of ideological and party political work employed during the years of the Great Patriotic War are acceptable today. That is, the determining factors have been and remain the nature of the specific situation and the ability of the ideological workers to fully use the strength of the word and personal example.

Nevertheless, the search for new forms and methods of work is being carried out in many troop collectives, VUZes and institutions of the Air Forces. It is important that this be not a tribute to current fashion and not an attempt to adapt to the reorganization but rather a serious and well-organized undertaking which should confirm all which serves it and discard all that impedes. For us, creativity, initiative, tenacity and a considerate attitude to tested practical work are as essential now as the air.

The ability to boldly solve the pending tasks and arising problems and with initiative and on a high professional level to perform functional duties, to achieve success in the assigned work area and ensure steady progress, to act depending upon the situation energetically and tenaciously for the sake of achieving a high end result in increasing combat readiness and military skill--this is what is now needed from each military aviator. No one has the right to remain on the sidelines and we must all take the test of the reorganization. We are directed to this by the 27th CPSU Congress, the January (1987) Central Committee Plenum, the Decree of the Party Central Committee and its appeal to the Soviet people on the occasion of the approaching jubilee of the Great October Socialist Revolution.

In voicing our views on the ways to accelerate a reorganization in ideological work, we would like to invite the commanders, the political workers and the volunteer propagandists of the Air Forces units and formations to reflect, to discuss frankly and exchange experience of practical activities in resolving the raised problems.

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## AIR FORCE PERSONNEL DISCUSS PILOT PROFESSIONAL DEVELOPMENT

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[Discussion materials, published under the heading "The Air Fighter: Problems of Development," prepared by AVIATSIYA I KOSMONAVTIKA correspondent, Lt Col G. Drugoveyko: "Ascent to a Profession"]

[Text] In their letters to editors, in comments at reader conferences and in conversations, the aviators of the line units have raised the question of the development of an air fighter.

This problem, as is known, is complicated and involves many aspects. Any attempt to resolve it once and for all is doomed to failure as something remains uncovered, something may cause argument and something may seem obvious. This is all quite natural, as each person is at his own level of analyzing this problem and at a given moment he may be confronted by one of the aspects of development.

Proceeding from these considerations, the editors have decided to give the floor to aviators who differ in position, degree of training, flight experience, involvement in the process of shaping the Air Forces personnel and influence on them. Here we have stipulated that by development we will understand not only the professional flying progress but also official command, because these two aspects in the potential of an air fighter's personality are inseparable. Certainly beginning from the leader of the two-plane element, a pilot's value does not end solely with his individual combat qualities.

Lt Gen Avn I. Sviridov, USSR Honored Military Pilot:

The main principle in an aviator's combat development, in my view, is continuity. Experience shows that one has only to overlook this when one begins to slide back. I feel that from time to time one must ask oneself: "What sign can I place in front of the stage of life which I have gone through: a plus or a minus?"

Quite possibly this line of argument is so apparent that it does not merit special attention. But life is not always so simple as initially there can be

a halting and then stagnation can set in unnoticed. For example, the following might happen....

The tactical flight exercise had ended. The troop collective had demonstrated outstanding combat skills and skillful, coordinated and close work in all elements of the complex aviation mechanism. Of course, such a result was preceded by extensive organizational work by the commander and his staff. New ideas had been worked out which had seemed very interesting, but these had been uncompromisingly weeded out as unsuitable, scores of versions of combat were examined, serious calculations were made, and a number of assumed specific flight assignments was planned. Putting it briefly, all of this was the result of reflection, searches, problems and disputes and sometimes very acute ones.

But then the exercise was over. There was a great temptation to work calmly, without complications and the straining of nerves. However, the person who submits to the temptation of resting on yesterday's achievements is doomed to defeat in real combat. For precisely this reason there can be no lulls either in the struggle to maintain and improve combat readiness, in technical creativity or in the struggle for flight safety.

The development of a pilot does not occur automatically. Superiors take an active part in it. It is important for a commander to firmly remember his duty to his subordinates. He is obliged to provide a taste for combat training whereby each day, each assignment and each flight provide an affirmative increase in skill, experience and temper character. Not coaching but a true encouragement of independent, responsible labor--this is what improves the pilot.

The commander must master the art of controlling affairs and personnel to such a degree that, on the one hand, each subordinate works at the limit of his capabilities and, on the other, he should be given tasks and assignments within his capability. Simplification does not provide advancement. A task beyond the capability of an aviator may arouse doubt and uncertainty in his own forces.

There are commanders who complain constantly of the excessive regulation of flight service and to the limiting of initiative. Then the superior command issues a document which not only provides scope for commander creativity but also requires the introduction of a new approach to combat training practices. What happens? In certain units the entire progressive focus of the received instructions is emasculated. All "creativity and initiative" go into oversimplification and into the search for possibilities to work without strain and with less responsibility for their commander decisions. I pose the question: "Where then is your creativity and what is the initiative?" In reply I hear references to flight safety, the lack of time and the work overload of the leadership. Flight safety is of course persuasive. But an analysis of the state of work in this most important area indicates that here simplification reigns, that is, formal measures and plans which include scores of paragraphs which will most likely not be carried out.

Yet there is not enough time because in the attempts to adapt to the reorganization the incompetent individuals conceal their poor organizational abilities behind a number of hours spent in service. The recopying of documents without a thoughtful elaboration in terms of their collective and constant reworkings of cumbersome procedural plans--all of this should, in their mind, replace real work. And it frequently does. It is perfectly obvious that the leader is weak but how can he be strengthened? He himself is almost always in service as well as all the personnel under him. Hence, as is frequently felt, he is a strong-willed commander. But subordinates see everything and understand everything. And often from such understanding they develop service apathy as it is simply impossible to carry out empty bureaucratic plans with endeavor.

I would like to repeat that the commander's duty to the state is also his duty to subordinates. The commander is the director of the combat development of the air fighters. And he should truly rack his brains over this.

Here I do not wish to release the rank-and-file pilots from the responsibility for their own combat development. We all have the same responsibility to the motherland. And if a pilot realizes that he is constantly following the same circuitous path of professional training, then he must do everything to break out of this circle and sweep away all obstacles on the path to combat skill.

However, I would concentrate attention on the development of the commander, because any flaw in leading the affairs of the collective assigned to him is multiplied by many-fold and gives rise to shortcomings in the training of subordinates.

Lt Col A. Gunko, Chief of Air Gunnery and Tactical Training, Military Sniper Pilot (Moscow Military District Air Forces):

I consider piloting techniques to be the heart of development for an air fighter. According to the principle an aircraft can do what the pilot is capable of. This principle can be realized only with a strict individual approach to the methods and to a program for training the aviator in simple and then involved elements. One pilot may master an aircraft rapidly and another not. It is essential to look the truth straight in the eyes and recognize that it is impossible to simplify the profession of a military pilot.

After the stage of mastering the art of piloting comes the stage of gaining combat expertise. But here, we feel, it is essential to delimit two areas: the technical and the tactical. Initially, to bring the ability to employ the technical capabilities of the aircraft to a high level and then develop the ability to realize these with the greatest tactical effectiveness.

This, in my mind, is the general approach to mastery. Certainly, in combat training practices the freedom of piloting and mastering the equipment as well as tactical progress are of course achieved in parallel. The concern of the commander in organizing the flights is to constantly remember what aspect of professional skill is being improved precisely now and to closely monitor the

development of subordinates so as to promptly switch them to the next stage of complexity.

I would like to take up what is possibly a debatable idea. For some reason such a method of flight personnel training as cramming has gained a negative reputation. But certainly the synonyms of this term are acceleration and intensification. This, in essence, is an immutable demand of the times.

Possibly, in some places cramming is replaced by an unthought-out, unprepared and unsupported forcing, when because of errors in organizing combat training something has not been carried out and the temptation arises to make up the oversight in a single sweep. But this is not cramming. In essence this is deception or the masking of organizational mistakes at any price. If a plan provides that at a certain stage in the training year the efforts of the personnel will be focused on mastering a specific element of combat skills and if complete preparations for such effective work are promptly carried out, won't this method serve to rapidly increase the combat potential of the collective and each aviator?!

Maj Yu. Priymak, Air Squadron Commander and Military Pilot 1st Class (Air Forces of the Group of Soviet Forces in Germany):

Of interest to me is the following aspect of the complex problem of a pilot's development: the cooperation of the collective and the individual in the process of combat development. Certain pilots are convinced that the forming of the collective is merely the concern of the command and the party aktiv. They reduce their role to the simple or, more accurately, the unenterprising involvement in all undertakings. This is a harmful notion!

Let us assume that I am to execute a flight for air combat. I have noticed that the "enemy" does not burden himself with particular creative effort. Hence, one can count on an easy victory and the next "five" in the flight booklet. But do I have the right to such ideas? Duty obliges me to say to my comrade: "You are letting down both me and the collective." And not only to say this but also to demand the answer as to why.

Laziness and laxness on the part of a pilot can bring an easy victory to another in combat training but does not provide an increase in combat skill for victory over a real enemy.

In the course of daily training, a pilot's ability to conduct combat is shaped in the "struggle" with his colleagues. The readiness for an air engagement is measured by the complexity of that school through which he passed in the subunit and by the difficulty of carrying out those tasks which his comrades have prepared for him. The involvement here is for all.

For this reason, in pursuing strictly professional goals, an air fighter cannot help but improve the entire way of training and life as well as relationships in the collective.

Maj S. Dmitriyev, Air Flight Commander and Military Pilot 1st Class (Baltic Military District Air Forces):

I am consciously taking one aspect of the problem in the development of an air fighter, that is, his moral and psychological training. This, in my view, is the basis for all the other combat qualities of a military aviator. It might be argued that this is so apparent that there is no problem and hence no grounds for discussion. But...

A. Makarenko has written that it is impossible to indoctrinate a courageous man if he is not constantly confronted with the need to perform courageous deeds. It is perfectly apparent that there is always danger and risk in the flying profession. But this does not mean that courage is developed automatically and there is supposedly no need to be particularly concerned with this. In turning to my own experience, I have learned that the equipment is dependable, I am trained to carry out the assignments, I am prepared for each flight and for this reason it is extremely rarely that I must overcome fear and danger.

I know many pilots who fly without any potential emergencies year after year. Undoubtedly, one can only rejoice in this. Hence, things have been well organized and hence the most serious attitude and corresponding skills for

everything. But if one is not particularly concerned with training boldness, tenacity and the ability to overcome fear, then will the pilot be ready for combat with the highest level of professionalism?

The stories of veterans show that the experiencing of the danger of combat does not pass without a trace. However, each new encounter with it requires that everything begin anew, although each time this struggle with one's own nerves goes easier and more successfully.

What am I proposing? First of all, specialized exercises on simulators and those types of sports which train not only the body but also the "muscles of the soul." Naturally, we must have real help from the psychologists, recommendations and procedures which would model the combat situation, which would confront the pilot with the need to show boldness and decisiveness and would "rack" the psyche in such a manner that, having overcome an organized testing, the pilot would feel his maturation and grow in confidence that any assignment was within his capability and any situation finds me prepared.

Lt A. Smirnov, 1986 Graduate of the Higher Military Pilots School (Carpathian Military District Air Forces):

As for now I can judge the development of a military pilot solely from the experience of my senior comrades. Even now, I can see that professional mastery is not determined solely by flight experience. Not all pilots who have served the same number of years are equal in combat skill. This forces one to seek out a program for life which would actually mean development.

One thing is clear: it is essential to actively master the experience of the leading officers. And this means in everything: in preparing for flights, in widening one's ideological and theoretical viewpoint, in the "technology" of performing specific assignments, in organizing personal time and in gaining independence.

As it turned out, it was not so simple to master the experience of others. In school we worked, so to speak, basically under receiving conditions. We were explained things in detail, we listened carefully, we remembered and endeavored to reproduce theory in flight practice as accurately as possible. In the line unit we gained an idea of what independence is. The pace of combat training did not allow our commanders the opportunity to constantly return to the same problems as constantly new, more interesting but also more complicated ones were arising. For this reason, we ourselves should be primarily interested in the growth of combat skill. Each is obliged to master his profession in tandem with dependable mentors and not put his burden off on others.

At present, the chief enemy of young pilots is follow-the-leaderism, that is, the desire to live and fly by the hints of others; the search for guilty parties of one's own failures and shortcomings outside oneself; the expecting of help with any complication. The main ally of myself and of my comrades, is of the enormous desire to become a true air fighter. It is the undertaking of a few, that is, to turn a dream into work: into read books, into drills and trainings, into answers to questions in which each flight is so rich. At present, we are at a stage of our development when only one approach is justified, that is, a merciless attitude toward one's own weaknesses.

The first lessons which we gained from the best professionals of our unit indicate that it is essential to go very attentively into all details and all minor questions. For example, I recall well from the stories of the instructors that it is essential to spot a good marker for the dependable identification of a ground target. Recently I learned that a target area must be checked following the principle of the similarity of markers which can mislead a pilot. If these exist, then obvious distinguishing features must be ascertained. Now this seems obvious. But for me this obvious point became apparent only through the experience of my senior comrade.

All my fellow classmates are agreed that our school theoretical knowledge must be substantially reworked. A certain air combat arm, a definite type of aircraft, the particular features of the climatic and landscape conditions and the combat training tasks posed for us--this is that range of realities which dictate the immediacy of great work.

\* \* \*

The participants of the talk have touched upon only individual aspects of combat development and certain facets of it. But they force us to think, to reflect, and to seek out new things in training and in indoctrination methods

and share experience so that the achievements of the pacesetters become our common property and this will undoubtedly help to accelerate the development of the air fighters.

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## SERVICE RECORD OF DECORATED HELICOPTER PILOT REVIEWED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 6, Jun 87 (signed to press 30 Apr 87) pp 12-15

[Article, published under the heading "The Motherland Has Decorated Them," by Col Ye. Besschetnov: "Degrees of Courage"]

[Text] During the evening of 18 February 1987, millions of television viewers watching the Vremya [Time] program, witnessed the presentation of the USSR orders and medals to the nation's finest. The member of the Politburo of the CPSU Central Committee, the Chairman of the Presidium of the USSR Supreme Soviet, Comrade A.A. Gromyko, commented on a particular feature of a decoration: for the first time in the Kremlin, the Gold Star of the Hero of the Soviet Union was being presented to a serviceman who had shown courage and heroism in carrying out his international duty on the land of Afghanistan. This hero was the helicopter pilot, Maj Nikolay Ivanovich Malyshev. "In presenting the award here, in the Kremlin," said Andrey Andreyevich Gromyko, "we again emphasize the importance of that sacred fraternal aid which the Soviet soldiers are providing to the friendly Afghan people in the fight against the dushman and mercenaries who are infiltrating and being sent from abroad into Afghan territory."

Thus the name of the deputy commander for political affairs of the helicopter squadron, the Military Pilot 1st Class, Maj N. Malyshev, became known throughout the country.

We met him on the eve of the noteworthy event in his life, the Kremlin reception. Nikolay Ivanovich, of medium height, strong, broad-shouldered and with large facial features, was in dress uniform but somehow felt awkward in it. Certainly he was much more accustomed to wearing flight garb as he has more than 15 years of service in the Air Forces. Naturally, the conversation immediately got around to his way into aviation, the mastery of helicopter equipment, flights in Afghan skies and the providing of international aid to the people of this nation.

--Nikolay Malyshev was born in the Far East, where his parents Ivan Arkhipovich and Mariya Nikolayevna, worked at the Sagur gold placer. Nikolay spent his childhood and young years in Ulyanovsk Oblast in the village of Kashinka, Tsilninskiy Rayon, where the family moved soon after his birth.



After completing the 10-year school, the young man began to wonder what he would do with himself. This was a time of searching. He wanted to better understand what he wanted out of life. Since childhood he had been drawn to aviation. But he could not be admitted to a school as he had not passed the medical commission. He went to work as a mechanic at the locomotive depot in Ulyanovsk.

In November 1968, Malyshev was inducted into the army. The medical commission in the military commissariat was struck by his strong development. He explained: he liked sports and for 10 years had walked to school, 5 km each way. He walked in rain, snow, the hardest frosts and spring mud. He grew stronger. "With your health you must serve in the airborne troops," he was told. Nikolay agreed with joy. He was sent to the most difficult group, the reconnaissance company.

That period of regular service will probably never fade from his memory. He recalled particularly well the tactical exercises held on the territory of Kazakhstan. At that time he, as the driver of an armored reconnaissance vehicle [BRDM] as part of a squad had to participate in a drop in the "enemy" rear. He recalled how the vehicle slid down the guides to the open door and how it was grabbed by a powerful current of air. The landing troops of the squad also left the military transport. Malyshev saw the canopies of several parachutes open above the BRDM. There was a sharp blow at the moment of landing.... The men of the squad took their positions in the vehicle and without a pause entered battle against the "enemy."

Everyone passed the test with honor. The USSR minister of defense was watching the actions of the landing troops. He declared a commendation for the personnel of the reconnaissance company participating in the air drop.

Nikolay completed his regular service as a senior chemical warfare scout and squad commander. When in 1970, he left to be admitted to the Syzran Higher Military Pilots School, he already had to his count some 29 parachute jumps and around three-score commendations for exemplary service in the airborne troops. He successfully passed the entrance exams and became a student.

Nikolay Ivanovich recalls the years of study with excitement. It was an unforgettable time! Here, at school, he was appointed in charge of a class squad and was later the deputy platoon commander and not only learned theory and the operations of a helicopter but also learned to work with others. Frequently he gave advice to comrades, particularly on mathematics and aerodynamics where he was much stronger than the others. He was able to listen to each man about his concerns, to respond and to help. But he himself was attentive to the experience and knowledge of superiors. To this day, Malyshev is profoundly grateful to his first instructor, Sr Lt Nikolay Druzhinin, the thoughtful mentor of the officer candidates. The flight commander, Capt Nikolay Kulnev, who was exacting and just in everything, also gave him a great deal as a future pilot. It was due to them that Malyshev was able to be among the first to solo.

He completed the school with honors. In assigning the graduates, he was given the right to choose his place of service. Nikolay named the Red Banner

Belorussian Military District. When he arrived in the regiment he rejoiced as here they operated the Mi-4 helicopter which he had mastered at school. Hence things should go well! The young officer was immediately appointed flight navigator. This was a great sign of trust. And Malyshev, in recognizing the responsibility, carried out his duties excellently.

In the summer of the following year, he was sent with several other pilots from the regiment for retraining. In October, he was already a commander of a Mi-24 helicopter.

The flight in which the young officer served at that time was the first in the regiment to begin training in firing the PTURS [antitank guided missile] from the Mi-24. For Malyshev and his operator-pilot, Sr Lt Sergey Vinnitskiy, things went well and whatever the launch, it was a successful one. Their crew which had mastered combat employment well, was frequently sent out for exercises. The aviators demonstrated launches not only in their own district but also in the neighboring one. Each time they carried out the set task excellently and were given commendations.

At the same time, Nikolay Ivanovich felt a gravitation to work with the men. During the very first year of his officer service, he was elected the secretary of the primary Komsomol organization (Nikolay, incidentally, had been a communist leader at school) and in the following year he became a party bureau member and the deputy secretary of the squadron party organization. The trust rendered the young communist was justified with honor.

Later on came service in the GSVG [Group of Soviet Troops in Germany]. Although Sr Lt Malyshev out of inertia was still considered among the young pilots, in terms of his level of mastery he differed little from the experienced aviators and for certain types of combat training was ahead of some of them. This was confirmed in a tactical flight exercise when he had to operate over an unknown range.

--Malyshev, in leading the two-helicopter unit, brought the combat helicopter low over the forest. Somewhere ahead a range was hidden. And on it were targets. And not mock-ups, but real tanks, although old decommissioned ones. It was extremely difficult to seek them out in the forest but he had to. And hit them! Sergey Vinnitskiy and he focused all their attention. The crew was able to arrive precisely on target, it quickly sized up the situation and accurately fired at the tanks. The launches of the PTURS were brilliant. The crew of the wingman also performed well. They spoke with great admiration of Malyshev's skill in the regiment and the senior chief commended his crew.

Capt Malyshev was already a senior helicopter commander when in the winter of 1982 he was ordered to leave as part of the limited contingent of Soviet troops in Afghanistan for providing international aid to the fraternal people of this country. In April he had already begun to carry out combat assignments.

In truth, the squadron command, not knowing precisely what the new crew was capable of, at first assigned it less complicated tasks. This was the case, for example, in escorting motor columns. Seemingly this was a simple thing

involving "circling" over the column as need be and arriving at the airfield to be relieved by another crew. But one instance forced them to fundamentally revise their attitude toward the new men.

At that time, the squadron was helping the Afghan troops which had undertaken a combat operation against the dushman bands. They flew off to another "point" but did not take the Malyshev crew along. "Remain and escort the columns," ordered the commander. Of course, it was insulting, however, an order was an order and it had to be carried out. But it happened that precisely here the aviators were again able to excel. The Afghan column numbering around 600 motor vehicles was transporting cotton. On the first stretch the dushman succeeded in setting several vehicles afire. The column bogged down. The Afghan leadership turned to the Soviet aviators for help.

When the two-helicopter element headed by Malyshev (Capt Vyacheslav Buzin sortied with him) approached the designated area, Capt Valentin Belousov with his wingman had already been at work over the target and was returning to the "point." The dushman had begun firing, he radioed to Malyshev. "Go take a look where you can help. I can't stay longer as my fuel is running out."

The two-helicopter element picked up speed. Malyshev could see from far off that flames had engulfed scores of motor vehicles. A tank from the escort was on fire and smoke poured out of two armored personnel carriers. The dushman were maintaining continuous fire at the column stuck on the road. Malyshev instantaneously assessed the situation. The mountains were far off, some 3 or 4 km away. This was good as the bandits had nowhere to hide. Along the road ran a dry gully overgrown with reed and up toward the bank was a small garden.... Something was burning there.

The air spotter from the air column in an excited voice transmitted to him: "Hit the garden! Hit the garden!" They did. "Good. Do it again! Again!" And when the two-helicopter element made a new task, the spotter, having now become bolder, in the heat of combat fervor asked querulously: "Why are you flying so high? They do not have assault rifles. Drop lower. In any event we will cover you."

To their own peril and risk, Malyshev descended and then Buzin. The two helicopters at maximum low altitude moved along the gulley. Nikolay Ivanovich was even struck dumb by surprise as it was full of dushman. They had taken shelter there behind parapets made from stone and were firing intensely at the column. Both crews, having entered a fire duel, hit the bandits with unguided missiles and the quadruple machine guns mounted in the nose of the helicopters while the flight technicians fired light machine guns, sticking the barrels through the open blisters.

After several passes they had run out of everything including unguided missiles and the unit of fire for the machine guns. Malyshev was in such a state that he was ready to land, jump out of the helicopter and drive the dushman away from the vehicle column with his fists. The crew of Capt Buzin had also used up all the ammunition. "Return to the 'point'," radioed the leader.

But they did not succeed in getting away. Two MiG-17 with Afghan markings approached the area of fighting against the band. In the earphones Malyshev heard accented Russian: "Comrade, show us where to hit." Malyshev briefly reported on the situation. The Afghan pilots went straight into the attack, opening cannon fire against the bandits. The two-helicopter element of Capt Belousov was also approaching.

Malyshev returned to the airfield with his wingman. The aviators quickly readied the helicopter for a second sortie and back they went. In their absence the fighters and two helicopters had done good work as a significant portion of the dushman had been beaten and the remainder had scattered. The column, incidentally, had formed up on the road and was moving along escorted by an effectively delivered Soviet assault company.

Later on, the helicopter pilots learned certain details. The band had numbered around 400 men. Basically it had been destroyed. Only an insignificant portion had escaped into the mountains, but these remnants had quickly been caught by Afghan troop subunits. At the place of the engagement, the bandits had left much equipment including a large number of submachine guns, grenade launchers and other weapons. But what most struck the helicopter pilots was the tape recordings of the dushman fighting against the helicopter crews. Of course, these recordings were designed so that the band could report to their Western masters and request them to loosen up their purse strings to supply a new batch of weapons and ammunition. But now there was no one to turn over these recordings to "benefactors" from the capitalist countries....

After returning from Afghanistan, Capt Malyshev in June 1983 was assigned to the Red Banner Odessa Military District. He was offered the position of deputy squadron commander for political affairs. Nikolay Ivanovich agreed. He, of course, realized that a difficult burden would rest on his shoulders. And he resolved to work thoughtfully, seriously and at full force.

Initially it was not easy. Although he had some experience in working with personnel, there was much that he had to do to master the specific job. Not everything was going smoothly in the squadron. He had not only to organize combat training but also settle domestic questions. Malyshev frequently assembled the secretaries of the party and Komsomol organizations, he gave them tasks and set the dates of their execution. To put it briefly, he endeavored to rely more widely on the aktiv. That tempering which he had gained in Afghanistan helped him as Nikolay Ivanovich was confident that, no matter how difficult it was, he would master the new undertaking well. During this difficult period of working into a position, the young zampolit [deputy commander for political affairs] constantly felt the support and help of the deputy regimental commander, Lt Col Aleksey Petrichenko, the chief of the political section, Lt Col Aleksandr Panteleyev, and other experienced officers.

At that time, Maj Anatoliy Volkov headed the squadron. They had known each other well and their combat fraternity had been tested in fire in the skies of Afghanistan. Relying on the party and Komsomol organizations, the aktiv, the squadron commander and the zampolit steadily solved the immediate tasks.

During the very first month certain problems were eliminated. Prescribed order was strengthened in the squadron, rhythmical combat training was organized and discipline and organization rose. By the end of the year the squadron held a leading place in the regiment and had become outstanding. Incidentally, by this time Nikolay Ivanovich had received the next military rank of major.

Two years passed. During all this time the collective held a leading position in the regiment. In September 1985, military duty again summoned Maj Malyshev to Afghanistan.

From his own experience, Nikolay Ivanovich realized how important it was in a combat situation to have the officers from the leadership and the communists act boldly and courageously and set an example of flawless execution of military and international duty.

--The Afghan troops were conducting a major operation against the bandit formations in Kandagar Province. Two flights were assigned from the squadron of Lt Col A. Volkov to help them. One of these was headed by Maj N. Malyshev. They arrived at the place. The first combat sorties showed that the dushmen had rather strong air defenses. A number of helicopter crews still did not have sufficient combat experience. Nikolay Ivanovich was concerned as some of the aviators showed a lack of confidence. It was essential to somehow inspire the men and help them surmount the negative emotions. How could this be done?

He sought the advice of the commander. They worked out a plan of actions. Malyshev spoke individually with certain comrades and explained the situation. The inspiring word had to be backed up by deeds. After the squadron commander with a flight had detected the position of bandit firing positions, the arriving flight of missile-carrying helicopters scattered them completely, having destroyed a majority, and the flight headed by Maj Malyshev acted as the cover group in this area.

In some places the bandit gun crews still survived. Rounds exploded here and there on the ground. Nikolay Ivanovich replied to them. Ahead, to the right and to the left were tracer bullets however he, seemingly, did not notice them. Malyshev could not and did not have the right to flinch. The young crew commanders inspired by the example of the squadron zampolit, boldly and decisively attacked the surviving bandit firing positions and covered them with volleys of unguided missiles and cannon rounds. During this time the assault troops brought by troop carrier helicopters landed on a small area in the mountains and widened the captured staging area.

The personal example of the squadron commander and his zampolit helped the aviators surmount the psychological barrier and inspired them. Subsequently, the crews during the entire operation went out on combat assignments boldly and confidently. No one flinched in combat, although they frequently encountered mortal danger.

A matter of particular concern for Maj Malyshev was the ensuring of high effectiveness of party political work in conducting combat operations. Each time when the crews or groups were assigned to carry out the most crucial

assignments he, feeling great personal responsibility for the end result, unfailingly met with the party and Komsomol aktiv, he thoughtfully instructed it and gave specific assignments. And later he followed up strictly.

--At one time, at a distant point away from the collective, a group was serving headed by Capt Valentin Belousov. At the first opportunity, Maj Malyshev flew out there as he wanted to personally verify how things were going and how successfully the assignment was being carried out by the party organization secretary, Capt Yuriy Zaytsev, who here, in essence, was acting the role of a volunteer political worker. Having discovered some mistakes, he shared his experience with Zaytsev, patiently urging him to work concretely and purposefully and to maintain among the personnel a high morale and a readiness to ultimately carry out one's duty in any situation. Subsequently, Malyshev visited here repeatedly. He supervised, corrected and suggested. The fact that the group completely carried out the task confronting it was definitely due to him, the squadron zampolit.

During his first stay in Afghanistan, the communist, Maj N. Malyshev, flew around 460 hours and made 420 combat sorties. His military accomplishments were commended by the Order of the Red Star. The second time the officer spent 360 hours in the fearsome Afghan skies and made over 340 combat sorties. His feat was given special recognition and Nikolay Ivanovich was awarded the highest decoration of the motherland, the Order of Lenin and the Gold Star of the Hero of the Soviet Union.

--Having received the high decoration from the hands of the chairman of the Presidium of the USSR Supreme Soviet, Maj Malyshev said:

"I share the awarding to me of the title of Hero of the Soviet Union with my combat friends and I consider it as part of the glorious deeds of our crew, squadron and those subunits of the nation's Air Forces who are helping the Afghan people. Allow me on their behalf to say with certainty that the Soviet pilots are worthily carrying out their patriotic and international duty."

The path of Nikolay Ivanovich Malyshev in aviation, his service in various garrisons, and his involvement in providing international aid to the Afghan people show one thing: during all these years he was climbing step by step, following the path of military maturation. But now, having reached the high degree of combat maturity, the officer is continuing to advance. He is fully determined to justify the high award of the motherland by all his life and service.

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## MAINTENANCE PROCEDURES AT MOUNTAIN HELICOPTER PADS DESCRIBED

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[Article, published under the heading "Advanced Experience in Aviation Engineer Service Practices," by Capt G. Shnypkin: "At a Mountain 'Airfield'"]

[Text] Slowly, almost reluctantly, the blades of the helicopter main rotor began to spin. Drowning out the noise of the turbine starter, the engine turbines shifted to a high pitch. The aviators were leaving the mountain "airfield," a small horizontal area which had been an alternate "point" for them during the tactical flight exercise [LTU]. Here the helicopter crews had left to carry out the LTU assignments. Here, under conditions as close as possible to actual combat, the specialists of the aviation engineer service [IAS] had taken a major exam.

--The aviators had encountered difficulties immediately after landing. The altitude made itself felt in the thinness of the air and the abrupt temperature drops. For some, particularly the young specialists, colds and fatigue appeared. The physical stresses caused lability and dizziness in them. This is why from the very first hours of a stay in the mountains, particular attention must be paid to observing the conditions for work, rest and meals and for creating the essential conditions at each work area.

The subunit was promptly concerned with the rational positioning of the IAS personnel. For example, the squadron organized preparations of the aviation equipment for a sortie following the principle of shift duty and the combining of professions (of course, in observing the requirements of flight safety). For this for each flight day they assigned a group of the minimum necessary number of maintenance specialists under the leadership of the chief of the technical operations unit of one of the flights.

Such organization of the work done by the engineer and technical personnel made it possible to use the freed aviators for overhauling and rebuilding "damaged" helicopters, to assign teams of technicians to temporary base "points" which were distant from the main base and be concerned with providing amenities for the territory and quarters so that after an intense sortie or a hard workday at the parking area the aviators could bathe, take a shower or wash in a bath and play volleyball.

Some might say that this was superfluous. They did not come here to rest. However, experience has shown that the efforts to create such conditions are repaid a hundred-fold. In having an opportunity to rest, to relax, to get rid of excitement and recover their forces, the men on the next day worked at full strength.

The question of organizing the fueling of the helicopters had been thoroughly worked out by us. Fuel trucks were assigned to the subunit and these were constantly at the parking area. The drivers and experienced aviation mechanics studied the particular features of approaching each helicopter. They were promptly supplied with a copy of the flight planning table. This made it possible for them to quickly and effectively fuel the combat helicopters without additional commands from the duty engineer. Here the chiefs of the maintenance units of the flights and the squadron engineer had free time to more carefully inspect the aviation equipment and to provide help to the specialists in eliminating the problems discovered on it.

But probably the greatest difficulties were related to the particular features of operating aviation equipment in the mountains. The take-offs and landings at the "eagle-nest airfields," as such spots are sometimes called, in the dense clouds of dust frequently lead to the clogging of the intakes and honeycomb cells of the oil coolers with particles of vegetation and to increased erosion wear on the blades of the turbocompressors. All of this increases the possibility of disrupting the operation of the engine systems and can lead to such undesirable consequences as a drop in the speed of the turbocompressor, reduced engine power, and its unstable operation under various modes. At unequipped pads there is also the high probability of the cutting or piercing of the tires, the forming of holes in the stabilizers as well as nicks in the main and tail rotors.

Because of this, in the course of the LTU, we give great attention to specific inspections of the aviation equipment. Here all preventive work in the subunit is aimed at discovering and eliminating such characteristic malfunctions. For example, the adjustment of the automatic fuel equipment is usually carried out by an enterprise representative. This takes time and the combat equipment is idled and under the conditions of intense flights this operates on a special schedule. We have resolved this problem. One of the best trained chiefs of the maintenance units of the flights has been trained and provided with the necessary documents, attachments and spare parts. Precisely he, in possessing good skills and knowledge, performed the difficult job of adjusting the automated equipment. It must be said that the officer carried out this task as well as the plant representative.

The LTU gave the IAS specialists a number of lessons. In practice we were convinced how effective equipment repairs under field conditions can be when correctly organized and provided with supplies. Without this intense operation of the equipment is impossible.

The experience of certain IAS specialists in Afghanistan and which we drew upon in the course of the LTU shows that the Mi-8 helicopter is a dependable combat aircraft. There have been repeated instances when it has been hit by



scores of fragments and holes have arisen through the blade spars, the main rotor hubs, the engines, and the pipelines of the fuel and oil systems, not to mention damage to the electrical and radio equipment, but the helicopter still operated. However, it is a serious and dangerous error to hope solely on its air worthiness.

In using the experience of servicing and troop repair of aviation equipment in the limited contingent of Soviet troops in Afghanistan, in the squadron we have organized a mobile team which includes specialists from all maintenance groups and who have undergone proper training. They were provided with the necessary tools and materials. Practice has shown that the organizing of such a group is fully justified. In a few hours the specialists performed a large amount of work of high quality.

Here Sr Lt V. Dorofeyev particularly distinguished himself and he for exemplary fulfillment of his international duty, for a major contribution to ensuring combat readiness and proper working order of the aviation equipment and for courage shown in so doing, was awarded the Order "For Service to the Motherland in the USSR Armed Forces" 3d Degree. By an order of the USSR minister of defense, he was awarded the military rank of captain, a level higher than his position. At present, the master of combat skills, Capt V. Dorofeyev, is generously sharing his acquired experience with his fellow servicemen and is taking an active part in innovative work.

During the course of the LTU, the holder of the Order "For Service to the Motherland in the USSR Armed Forces" 3d Degree, Sr Lt E. Gavrilchev and Sr Lt I. Kozlev who has been awarded the Order of the Red Star did excellent work.

The successful execution of the flight assignments and the effective hitting of targets depended largely upon the trouble-free operation of the weapons systems. And it must be said that among our pilots there were no complaints against those who readied the weapons for a sortie. Indicative in this regard is the experience of organizing work in the group of aviation weapons and troop transport equipment headed by the Master of Combat Skills, Sr Lt N. Volodyagin.

Each specialist from this collective has not only thoroughly studied the employed weapons, the different versions of mounting the ammunition, possible malfunctions and methods of eliminating them, but has also mastered related specialties and, when necessary, can take over for a comrade. Specialists in the group have been so assigned that they simultaneously performed several sequential operations. For example, one was concerned with the gun equipment, another with the sight equipment, while several men were engaged in loading the unguided missiles and suspending the bombs and installing the fuzes. As a result, this most labor-intensive phase in readying the helicopter was combined with the jobs involved in servicing the aviation, electronic equipment, the helicopter and engines. The men of this group made a major contribution to the successful execution of the LTU tasks.

--The rotor blades were spinning ever-faster in their infinite path. Then the red-starred aircraft lifted smoothly from the ground and began to climb. The IAS specialists on board the helicopter were pressed against the blisters as

if trying to imprint in their memory this mountain spot familiar down to the last pothole and which for them had been the next peak on the path to the heights of combat maturity.

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## REVIEW OF SAFETY PROCEDURES IN THUNDER CLOUDS

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[Article, published under the heading "Constant Attention to Flight Safety," by Col (Res) A. Zavodchenkov, candidate of geographic sciences: "Dangerous Convective Phenomena"]

[Text] Cumulonimbus cloudiness is one of the most unfavorable meteorological phenomena for aviation. This frequently is accompanied by hail, torrential downpours and other dangerous weather changes. Instances have been recorded of intense icing of modern jet aircraft when they enter cumulonimbus clouds at an altitude of 8-10 km and over.

Thunder clouds most frequently form with the uneven warming of the ground-level air layer by the underlying surface, with the rising and forcing out of warm air by cold on an atmospheric front and with the rising of air along mountain slopes.

Observations have established that bulk electric charges occur continuously in the atmosphere and these move both in a horizontal and vertical direction. Such charges are formed with various processes of electrization, when a certain volume of cloud is saturated by charged particles predominantly of one sign. The strongest charges occur in cumulonimbus (thunder) clouds. In this instance, when in such a cloud the voltage of the electric field reaches a burst value (around 10,000 volts per cm), an electric spark discharge flashes between the different-sign bulk charges in the form of lightning.

An aircraft is subjected to particularly strong electrization in flying in cumulonimbus clouds which consist of ice crystals. Here the possibility of a discharge of lightning into the aircraft cannot be excluded, since its presence in the thunder zone helps to even out the potential of the cloud electric field.

Such clouds also have a substantial impact on the operation of radio equipment. Interference in the thunder zone to a large degree is related to the discharges formed as a consequence of friction against the aircraft of particles from which the clouds are formed. The charge gains a maximum value

on the edges of planes and on antenna devices. Its presence leads to an increase in radio static and often to the complete loss of contact.

It is essential to remember that the probability of encountering thunder discharges increases as the speed of flight rises. For this reason, it is advisable to keep the speed minimal. Moreover, with the forced crossing of a cumulonimbus cloud it is essential to switch off the automatic pilot and the radio and turn on the deicing equipment, the instrument lights and during nighttime, also the lighting.

In flights through cumulonimbus clouds, air turbulence is formed and this usually causes very bumpy air. It may happen that the angle of attack is greater than the critical, the aircraft will lose its stability and the g-load will grow to a dangerous limit.

As is known, internal thunder is marked by a short length (so-called local thunder) and low mobility. The speed of its travel does not exceed 15-20 km an hour. This thunder is intense, rich in lightning and frequently accompanied by torrential downpours and sometimes hail. Internal thunder is easy to avoid, although it is essential to bear in mind that in a flight it is not always easy to distinguish such thunder from frontal.

An approach to a rapidly moving front from the rear is not dangerous as the pilot has a good view and can clearly determine the cumulonimbus cloudiness from its external appearance (its dome shape and strong vertical development) and can undertake the necessary safety measures. A different picture is observed in approaching a slow-moving cold front from the rear. In this instance the cumulonimbus clouds are veiled by stratus clouds. Without having noticed them, the pilot, in entering the calm stratus clouds, can end up in cumulonimbus cloudiness in a zone of heavy turbulence and bumpy air. Flight safety in this instance is not guaranteed.

Practice shows that radar reconnaissance makes it possible to promptly detect thunder centers and ascertain their direction and speed of travel. This is carried out with equipment turned off designed to suppress the blip returned from meteorological targets. The scanning must start from the smallest scan scale corresponding to the greatest radar operating range. Initially the antenna angle should be set at -2 degrees and subsequently gradually increased to +3-4 degrees.

In order not to get into thunder clouds, the crew must, in using meteorological information from the ground, the data of aircraft and ground radars and visual observations, carefully monitor the weather and promptly determine the distance to centers of thunder activity and the direction of the travel of the clouds. At the established distance from the thunder centers, a safe route of flight should be set and then a bypass maneuver commenced. For assessing the thunder danger at night it is essential to employ the indications of visible aircraft electrization.

The most intense electric discharges and cases of the hitting of aircraft by lightning most frequently occur in a descent or in breaking out of the tops of clouds at altitudes where the air temperature is close to 0 degrees or lower.

In a flight in no instance should one enter a dangerous zone of cloudiness. In encountering cumulonimbus clouds, the crew should skirt them at a distance of no closer than 10 km.

It is important for the duty weatherman and the flight operations officer to maintain constant contact in assessing the meteorological situation. The weatherman must promptly predict the times of the appearance of thunder and other dangerous convective phenomena in the area of the airfield (or of the flights).

On the basis of evaluating all the aerosynoptic material and the report of the duty weatherman, the commander, the flight operations officer and all the flight personnel should consider the meteorological situation in all stages of preparing and conducting the flights. This is an important guarantee for ensuring flight safety in meteorological terms.

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## GREATER ATTENTION URGED FOR PILOT PSYCHOLOGICAL TRAINING

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[Article, published under the heading "For High Combat Readiness," by Maj A. Zhilin: "Indisputably About the Disputable"]

[Text] The following instance served as the grounds for this discussion. In becoming acquainted once with the pilot certifications, I noticed that a majority in them was given rather one-sidedly. In particular, basic attention was given to how the officer flew but there was not a single word about how ready he was to carry out a mission in real combat.

As it turned out, such an approach in evaluating the combat capability of the aviators is not accidental. From talks with the flight commanders it became apparent that many of them sincerely considered the flight training level of subordinates to be the crucial indicator of combat maturity.

There is no dispute that high flight skills are one of the important components of victory in combat. At the same time, as was shown by the experience of the Great Patriotic War and the local wars started by imperialism, not only this determines the outcome of the duel. The victors were most often the diversely trained air fighters who were physically and morally strong. Hence, the level of the professional skill of flight personnel must be viewed as a range of knowledge and skills and high moral-political and psychological qualities. This, incidentally, is persuasively confirmed by examples from daily service and training of the current generation of aviators.

--Military Pilot 2d Class, Sr Lt Yu. Popov was to intercept a low-altitude target. The officer prepared rather carefully for the sortie. He answered confidently and intelligently to the readiness quiz. Seemingly he had solid grounds for an excellent evaluation. But...

At the designated time Popov brought the missile-carrying aircraft to the designated point and executed the required maneuver. The target blip soon was flashing on the sight screen. From the command post came permission for the attack. However, the interceptor slowed down and the designated intercept

point was far behind and the pilot was given the command to return to his airfield.

In essence (and this was precisely how this instance was viewed by the unit leadership) there had been an extraordinary incident. Certainly under present-day conditions, when the probable enemy possesses powerful nuclear missile weapons, the nonfulfillment of a mission by a fighter can entail very lethal consequences and it can be very difficult to overcome these subsequently. Hence, a pilot should consider each sortie as crucial and endeavor to ensure the unconditional execution of each assignment.

Let me immediately stipulate that what I have said in no way means that Sr Lt Popov had neglected this demand. The question is something else. What prevented the flight and squadron commanders from preparing their subordinate for a sortie in a manner that a combat situation required? Obviously, here not the least role was played by the grading of flights into simple, complicated, crucial and so forth; this has recently become engrained in certain subunits and is completely unfounded. The various flights are carried out not because of the difficulty of the mission carried out but because of the reason of them. Here, I feel, is where the stream of formalism, routine and ostentation in combat training takes root, in subsequently becoming in some places a rather strong river of deception.

A subunit commander may reason approximately thus: if a subordinate has received a three or even a two for an "ordinary" flight then this is not so bad. The main thing is that in the tactical flight exercise or in a final inspection he perform successfully. Possibly it may seem strange but such reasoning exists, in giving rise to a flippant attitude on the part of the aviators to quality indicators for their work and contributing to the taking root of complacency in the minds of the men and at times indifference to the results of their daily job. Probably for this reason individual crews do not always show high combat activeness and, to put it figuratively, cracks appear in the foundation of combat skill.

I anticipate possible arguments that, supposedly, no commander would permit a subordinate to fly without being certain that he was professionally ready for to act otherwise would be to cut off the branch you are sitting on.

On the one hand, this is actually the case since precisely a commander is responsible for the training of a subordinate and the correctness of his actions in the air. But here there sometimes is a miscalculation in the fact that the main emphasis, as a rule, is put primarily on the level of piloting techniques, on navigation, tactical and gunnery training. On the other hand, in addition to these components of combat skill, there is one other equally important one, the moral-psychological conditioning which is simply forgotten in the daily routine.

A military pilot differs, for instance, from a private flyer or the pilot of a passenger aircraft in the fact that he is primarily a defender of the motherland with all the ensuing duties. He should be ready at any moment to decisively engage a perfidious, shifty and well-trained enemy, recognizing the entire burden of personal responsibility to the people for the assigned job.



And these are not merely high-sounding words. The experience of the last war indicates that, alas, it is far from sufficient to have just the ability to skillfully control the aircraft and bomb and shoot accurately. If only to surmount natural fear and suppress indecisiveness and confusion, it is important to have strong moral and volitional tempering along with special skills.

For this reason the level of the fighting qualities of the crew members cannot be restricted to merely a "blind" testing of the knowledge of instructions and regulations. Such primitivism emasculates from individual indoctrination the main goal of indoctrinating the man, the soldier ready consciously and without hesitation to act as duty commands, even if this will cost him the most precious thing, his life. In order to achieve this, the commander should be able to see the soul of a subordinate and starkly distinguish and correctly shape its ideological and moral tones. And this, it turns out, is the most difficult to learn.

And here, it seems to me, it is important to have a synthesis of educational skill and pedagogical wisdom of the mentor. Let us be frank: very insufficient attention is given to developing these qualities in the indoctrinators of young pilots. To put it mildly, the secrets of success for real experts of instruction are very meagerly propagandized. Often such a situation is explained by the fact that the flight commander has, supposedly, become substantially "younger," while wisdom, as is known, comes only with years. It is difficult to agree with such an opinion because most often they speak thus in those collectives where the leadership is not seriously concerned with the indoctrination of the indoctrinators themselves and where work with the personnel has been neglected.

It is no secret that in appointing an officer, for instance, to the position of flight commander, he is evaluated primarily by the criterion of flight skill. Undoubtedly, the commander must fly well. But he must also train and indoctrinate his subordinates. Hence, the ability of the claimant of a vacant position to work with others, to find contact with them and his commander and

pedagogical attributes should be viewed equally with his ideological and moral tempering, for without them the officer will simply not work in the new position.

In resolving this problem, as practice shows, there is one essential flaw: in some places the young flight commanders are not clearly taught such an important and delicate question as individual indoctrinational work. Many aviators with whom I spoke have mentioned this. Thus, it turns out that having assumed a position, the newly created flight commander basically acts, so to speak, by intuition and at best merely copies his former mentor.

At the same time, life shows that high moral-combat qualities are the result not of a separate spontaneous process but rather an outgrowth of effective training and indoctrinational work and this simply cannot be organized without having a clear notion of how this is done. As a rule, the most complete picture of the capabilities of pilots are found among those commanders who

profoundly study their subordinates, who analyze their actions not only from the professional viewpoint but also the psychological one, and who direct their energy, thoughts and aspirations in the required direction. Let me give the following example as confirmation of this.

Lt Yu. Uvarov arrived in the flight of the Military Pilot 1st Class, Capt E. Andreyev for further service. The commander's very first acquaintance with the new man did not leave a good impression as he was closed off and passive. He showed very mediocre qualities in an inspection flight. But still the flight commander did not make rapid judgments and was in no hurry to inform the superiors of the "lack of promise" of his subordinate. In the process of the planned exercises, Andreyev endeavored to understand the conduct and attitude of the young pilot. Later it became clear that Uvarov's uncertainty had been caused by omissions in professional training and which he feared to openly admit. The flight commander had to do a great deal of work with him. Gradually the situation straightened out. Now Uvarov is among the right flankers of the socialist competition and is confidently mastering difficult types of combat training.

To the question of what he considers the main thing in his work, Capt Andreyev replied:

"To establish with subordinates a type of contact where they fully trust me and do not fear opening their heart whether out of joy or pain...."

These words show the commander's viewpoint. He is concerned primarily with a man with all his concerns of life. We feel that such a viewpoint is correct. Precisely concrete concern for subordinates makes it possible to establish a healthy collective which can achieve lasting final and not momentary successes in combat training.

In principle it is not so hard to force people to work actively in a tactical flight exercise or, as they say, lay themselves out fully. Ultimately, any commander has sufficient powers for this. But what is the benefit of any rush campaign, if on the next day the collective is again engulfed by a wave of passivity and indifference.

It is much more important in the subunit to establish a situation so that the aviators themselves endeavor to work rhythmically, with high quality and at the set pace. This can be achieved not so much by the force of an order as by an effective influence on the awareness of the men.

Unfortunately, not everyone shares the position of Capt Andreyev in the collective. Thus, in speaking with one of the flight commanders, I heard from him literally the following:

"I have so much work to do that there is simply no time to nurse along each pilot, technician or mechanic. It is essential to ensure the combat readiness of the subunit...."

That was it, no more no less. As strange as it may seem, one encounters such arguments rather frequently. And each time in such instances you want to ask

the question: But who, if you please, provides for the combat readiness of the subunit and unit if not the men? Ideologically tempered, morally and spiritually strong. Certainly without them, any, even the most talented commander is not worth a penny, since he alone cannot carry out the tasks confronting the subunit. Hence in order that the men take an active part in the combat training process, it is essential to work with them and indoctrinate them.

For Capt Andreyev, incidentally, things in the flight, in contrast to the other speaker, are much better. And this is natural. Painstaking individual indoctrination and attention to subordinates guarantee positive results. Such a detail is characteristic. The officer does not limit himself to just carrying out the requirements of the supervisory documents but endeavors to organize the training process creatively and by personal example endeavors to involve the men in carrying out the set tasks, to interest them in a vital matter and arouse in them a feeling of responsibility for carrying out duties primarily for themselves.

When young pilots arrived in Andreyev's flight, he not only taught them to confidently pilot a modern aviation system, but also developed in them initiative, determination and independence. Capt Andreyev unswervingly observed the teaching sequence and scrupulously monitored the training of the crews for each flight. In this, as we can see, there is nothing particularly new. The training and indoctrination procedures are the traditional ones. Only here they are employed in a differentiated manner. Incidentally, one distinguishing feature must be mentioned: his subordinates, in constantly feeling the support of their mentor and his concern for their development, are aware that they simply do not have the moral right to work half-heartedly.

It must be pointed out that the volitional tempering of the aviators is constantly at the center of attention of the flight commander. In conducting air combat, for example, he judges this from the preciseness of the pilot's execution of the guidance commands, by the executing of maneuvering, the determination of the attack, and the stability of the in-flight monitoring indicators. Capt Andreyev monitors particularly closely the actions of his subordinates in a LTU. The point is that the increased tension in the exercises, the unexpected changing of assignments, the necessity of constant analysis and assessment of the rapidly changing tactical situation establish a particular emotional background making it possible to more clearly see shortcomings in the moral and psychological training of the crews and which are not so easy to spot in daily flights. Such observations, like the delicate dabs of an artist's brush, help Andreyev create a stark and expressive moral-psychological "portrait" of each subordinate and serve as the starting point of the individual indoctrination.

In conversations with aviators, the following problem has surfaced. Certain flight commanders assume that moral-psychological training is the prerogative solely of the political workers. Analysis indicates that such an opinion did not arise accidentally. Its prominence was aided by the fact that the flight commander was basically responsible for just the flight training of subordinates. Hence the neglecting of work with the men.

At the same time, it has long been shown that precisely the flight commanders have the greatest opportunities for effectively influencing the volitional tempering of the men, since in practical terms they are constantly with their subordinates in the classroom, in the trainer and at the airfield. However, far from all mentors utilize these opportunities. And not only because they do not wish to burden themselves down with "superfluous" concerns but because due to the existing circumstances it at times is difficult for them to fashion the time for this as they are overwhelmed by "paperwork." Most lamentably, there is no end to this in the foreseeable future. One should not be surprised that at times all individual indoctrination comes down to the banal dialogue of commander and subordinate:

"How are things going?"

"Normally..."

It is impossible not to note that recently a significant gap has formed between the flight training methods and the moral-psychological training of flight personnel. We feel that this phenomenon merits the serious attention of both commanders and scientists concerned with such problems. In recent years more than enough scientific works of all sorts have been written on psychology, but as yet there has been little benefit from them. At times, the recommendations of psychologists are divorced from real life. And even those which are undoubtedly useful are introduced into the training and indoctrination process with great birth pains. Insignificantly little time is also assigned to studying the principles of military psychology and pedagogics in the commander training system. As a result all of this has a negative influence upon the quality of combat training for air fighters. Is it not time to determine the persons actually responsible for this state of affairs?

The readiness of a pilot for real combat against a strong enemy is the main indicator of combat readiness. This is an axiom which needs not proof in useless, drawn-out disputes but simply assimilation. And the sooner the better.

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## FOLLOW-UP ARTICLE DISCUSSES BETTER PREFLIGHT MEDICAL EXAMS

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 6, Jun 87 (signed to press 30 Apr 87) pp 22-23

[Article, published under the heading "We Discuss the Article 'The Skies Do Not Forgive Mistakes'," by Lt Cols Med Serv Ye. Berezhnov and S. Motsar: "The Right to Fly"]

[Text] The aviation medics have an important role to play in carrying out the tasks of combat training and ensuring safe flying. They have many concerns and duties. But the main purpose of the regimental physician is to supervise the state of health of the aviators.

On a flight day, the doctor is one of the first to arrive at the airfield. And not only to promptly conduct a medical examination of the air fighters. Something else is also important: to establish in them an emotional attitude for the forthcoming flight operations shift, and remove the tension which involuntarily arises before the execution of a responsible mission. An approving word or good advice help make the adjustment to successful work.

Along with the regiment's leadership, the aviation physician guards flight safety and helps the men increase combat skill. He does everything so that his work fully ensures the protection of flight personnel health and extending the professional longevity of the aviators.

During flight on modern equipment, the pilot's organism experiences various effects such a vibration, noise, g-loads, drops in barometric pressure, hypoxia and so forth. In order to successfully endure these unpleasant phenomena and confidently command the aircraft, the air fighters should possess strong health, high physical endurance, nervous and mental stability, the ability to quickly shift attention as well as be able to quickly orient oneself frequently in a very complicated and frequently changing situation.

The aviation physician on a daily basis observes the health state of the pilots and studies their physical and psychological data. This provides an opportunity to prevent the development of undesirable processes in their organism. From our own experience we are convinced that the best form for

such observation is active involvement in the measures conducted on the eve of combat work, particularly in the course of the preliminary and preflight preparations. Precisely at this time it is possible to detect all deviations in the health state of the air fighters and which can have a negative effect on their actions in the air.

During a medical examination a physician can detect the initial form of an illness which still does not have clearly expressed indications, although the man already feels a certain indisposition. In such an instance only complete frankness on the part of the pilot can make it possible to promptly prevent a possible decline in work efficiency in the air and at the same time prevent a threat to flight safety. Frankness is also important with a disruption of resting and eating conditions. The observance of these and other rules will make it possible for the aviation physician to take a sound decision to clear the man for flying and thereby avoid undesirable consequences. But, unfortunately, there are many examples when the aviators act contrary to these demands. Here is one of them.

Military Pilot 1st Class, Capt A. Dunayev, on the eve of a flight period, felt he had a mild, as he later explained, cold. He treated himself at home. He concealed this from the physician. At the medical examination, to the question of "how do you feel?" he deliberately cheered up and replied "fine."

In the air, Dunayev felt a sharp pain in the head and ears and was forced to abort the mission. Upon examining him at the hospital, an acutely developing ear infection was discovered. How can one explain such actions except by irresponsibility and lack of discipline? As is correctly emphasized in the article "The Skies Do Not Forgive Mistakes," such negative aspects of flying cannot be tolerated, as they become a serious impediment to the growth of combat skill and are a reason for potential flight accidents. Lt Col V. Antryufeyev is correct that the laws of flying are the same for all. All aviators are equal before them. This is also mentioned in various supervisory documents. They focus attention on the real preparedness of the military pilot considering the present-day achievements of not only the military equipment and tactics but also medicine.

Aviation physicians must make an effective contribution to achieving a high level of professional health for the flight personnel in carrying out all the prescribed laws in the area of medical support for the flights. This will make it possible to effectively detect, profoundly analyze and promptly prevent any mistakes by the pilots on the ground and in the air. In our opinion, each mistake of an air fighter in carrying out a mission is the first symptom of his professional unpreparedness. Medical analysis of the mistakes should help to predict many negative aspects of flight practices and help the command effectively correct the combat training process. For this purpose the units have formalized charts with a maximum number of questions to collect information on the incorrect actions of the pilot or individuals of the flight control group.

Determining the negative phenomena in flight practices helps the physicians to more successfully carry out the tasks related to medical support for the flights and their safety. Only with such an approach to the question can the aviation medical service be so organized that the regimental physician, after examining the pilot, always rules: "Permitted to fly."

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## EXERCISES DESCRIBED FOR CREWS OF LONG-RANGE FLIGHTS

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[Article, published under the heading "Flight Safety. Advice of a Specialist," by Col Med Serv S. Melnik, candidate of medical sciences; Maj Med Serv A. Shakula, candidate of medical sciences; Capt Med Serv A. Semenov: "On a Long Flight"]

[Text] Modern aviation equipment places increased demands upon the pilot's psychophysiological qualities and the level of his work efficiency. The functional state of the organism of the crew members during a long flight changes continuously and this leads to a certain decline in resistance to the stress effects of the flight's factors and ultimately to reduced work efficiency. In line with this means and methods for maintaining the activity of aviators during a long flight have been worked out and experimentally established.

One of these is the method of self-massage of biologically active points (BAP) and designed to eliminate fatigue. This is based upon an altered version of therapeutic massage in which the choice of the method of effect and the localization of the BAP is determined considering specific flight activities. The positive effect of the self-massage of the BAP on the functional state of the organism consists in equalizing the main nervous processes (excitation and inhibition), the normalizing of blood circulation and improving the activities of the organs of vision and hearing.

The effect on the BAP located on the back of the hand (zone 1) and in the area of the exterior condyle of the tibia (zone 2) has a general toning effect on the organism and helps to eliminate sleepiness. Massage of the shoulder area (zone 3) is accompanied by reduced headache and muscular discomfort while the areas of the mastoid area (zone 4) and the exterior edge of the brow (zone 5) help reduce headache and increase visual alertness. The duration of self-massage of the BAP is a minute for each zone. This is carried out by the crew members with the permission of the captain after 1.5-2 hours of flight. Indications for its use are fatigue, sleepiness, muscular discomfort and fatigued vision. It is recommended that the captain, the co-pilot and navigator conduct a session of self-massage of the BAP before executing the

most crucial stages of the flight mission (bombing, low-altitude flight, midair fueling and landing).

Zone 1 is located on the back of the hand. On the right hand, the zone is determined with the thumb of the left hand and on the left hand, with the thumb of the right. Self-massage is carried out with a rotary movement of the thumb (one or two rotations a second). Here one should feel warmth in the palm and a mild pain in the fingers.

Zone 2 is located in the area of the outer condyle of the tibia some 3-3.5 cm below the upper edge. In locating the zone the leg must be bent at the knee, the palm of the hand placed on the kneecap, and the fingers pressed tight on the tibia. Here the third finger indicates the zone of effect. Self-massage should be carried out simultaneously on both legs.

Zone 3 is located in the area of the shoulders and lower neck. The palms of the hand are placed on the shoulder and with the index finger find the zone of maximum painfulness located along the upper edge of the trapezoid muscle. Self-massage is performed by rotary movements of the index finger with strong (to the point of pain sensations) pressure at the designated points.

Zone 4 is located at the base of the mastoid process. The zone is located and self-massage carried out using the index fingers simultaneously on both sides.

Zone 5 is located at the exterior edge of the brow where one can feel a depression. Index fingers are employed to locate the zone and work it.

With an extended flight the aviators must keep the same position for an extended time and this causes muscular discomfort and accelerates the development of fatigue. For combating the negative effects of this factor, it is possible to recommend a number of means, primarily physical exercises. These should be carried out every 2 or 3 hours of flight for 5-7 minutes wearing the oxygen mask to prevent the development of oxygen starvation. After the cycle of exercises, mood is improved, attention, precision and coordination of movements increase and emotional stress is reduced.

Initial position: sitting in the chair, legs bent, hands to shoulders, holding shoulder straps of suspension system.

Position 1. Bend forward, elbows to side and upwards, look up, breathe in.

Position 2. Bend right elbow to left knee, breathe out.

Position 3. Bend forward, elbows to side and upwards, look up, breathe in.

Position 4. Bend left elbow to right knee, breathe out.

Position 5. Raise left knee, grab with hands, pull strongly to chest, bend forward, breathe in.

Position 6. Release knee, hands on thigh, relax, breathe out.

Position 7. Raise right knee, grab with hands, pull strongly to chest, bend forward, breathe in.

Position 8. Release knee, hands on thighs, relax, breathe out.

Position 9. Turn trunk to left, stretch left shoulder to left, raise up and back, breathe in.

Position 10. Turn trunk to right, hands on thighs, relax, breathe out.

Position 11. Turn trunk to right, stretch with right shoulder to the right, raise up and back, breathe in.

Position 12. Turn trunk to right, hands on thighs, relax, breathe out.

Position 13. Shift body weight to left buttock, raise right leg, breathe in.

Position 14. Release, relax, breathe out.

Position 15. Shift body weight to right buttock, raise left leg, breathe in.

Position 16. Release, relax, breathe out, hands to shoulders.

The use of methods for maintaining the work efficiency of flight personnel during long flights increases the reliability of the human element in the "pilot--aircraft" system and helps to increase the effectiveness of carrying out the combat training tasks as well as maintain health and flight longevity.

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## U.S. MILITARY EFFORTS IN PACIFIC BASIN VIEWED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 6, Jun 87 (signed to press 30 Apr 87) pp 34-35

[Article, published under the heading "Imperialism--The Enemy of Peoples," by Col S. Zenin, candidate of historical sciences: "Through the Hairs of the Sight"; the article has been written from materials in the foreign press]

[Text] By the efforts of the most aggressive circles in the United States and its allies, the Asian-Pacific Region more and more is being turned into a dangerous area of international tension. The "new frontiers which offer the United States unlimited opportunities," emphasized the magazine U.S. NEWS AND WORLD REPORT, "are thousands of miles from the shores of America. These are located in the vast Pacific Region which stretches from South Korea in the north to New Zealand in the south." The cherished dream of Washington is to draw the ASEAN nations into the orbit of the imperialist blocs, to more deeply involve them in the confrontation with the states of Indochina, and to turn East Asia into a line for deploying American forward-based nuclear forces. The United States in this region has the same aim as in Western Europe, that is, to bring the first-strike weapons closer to Soviet territory and to utilize the allied countries as lightning deflectors designed to divert nuclear retaliation from itself.

The base system serves to achieve the strategic aims of Washington in the Pacific Basin. In terms of geography and the scale of the deployment of troops in this region, priority undoubtedly belongs to the Air Force.

Micronesia has been turned into an important military-strategic testing range of the Pentagon. Regardless of the protests from the native population and the world community, the United States has split its territory into four state formations: the Mariana Islands, the Marshall Islands, Palau and the Federated States of Micronesia. The agreements imposed on them about "free association" and "cooperation" have made it possible for the Pentagon to deploy nuclear and other types of weapons on the islands. The government of the Republic of Palau, for example, has signed a treaty granting three islands to the United States for a so-called lease running for 25 years.

From the strategic and economic viewpoint, for the American hegemonists, the deployment of air bases on these islands is of great importance. These make

it possible to keep the sealanes under control from the Persian Gulf to Japan and strengthen the connecting links in the chain of existing and planned air and sea bases on the islands of Saipan, Kwajalein, Guam and Tinian. Here they will station strategic bombers and the carriers of the 7th Fleet which the Pentagon intends to use to seal off the straits linking the Indian and Pacific Oceans.

The former U.S. Ambassador to Fiji, Bodde, pointed out: "The idea of establishing a nuclear-free zone in the Pacific, proceeding from considerations of a strategic nature, is absolutely unacceptable for the United States which will prevent this by all possible means."

The United States has given particular attention to the military bases in the Philippines. At present, 11 major American military installations are located there, including three air bases. The most important of these is Clark Field which can handle the most modern aircraft capable of carrying any types of nuclear weapons and Subic Bay Naval Base for the aircraft carriers and ships of the 7th Fleet.

Over 15,000 American servicemen are stationed at them.

The American bases in the Philippines for decades have served and are serving the American hegemonists as a springboard for expansion into the Asian Continent. In the 1980s, here the bases essentially carried out the functions of the rear support bases of the Air Force, the 7th Fleet and the units of the Rapid Deployment Forces located in the zone of the Indian Ocean. The Air Force strategists feel that in the event of the outbreak of war in the Near East area, for example, the Clark Field Air Base can be employed for military deliveries to Israel.

The American military presence in the Philippines has given rise to a number of serious problems of a socioeconomic and moral-ethical nature. The anti-base movement here is assuming an ever-broader scale. The struggle against the unequal, fettering treaties imposed on the Philippino people by American imperialism is led by the Communist Party of the Philippines. "The Communist Party is in favor," states the Open Letter of the Communist Party of the Philippines to the People, "of the ideals of peace and detente, it is against the American military bases on our national territory, the accelerating of the arms race and the rebirth of the Cold War."

The military-political leadership of the United States has given great importance to the air force bases in Thailand. Precisely here, according to data in the foreign press, during the U.S. aggression in Indochina were 35,000 American pilots and technical specialists. From here the American Air Force made more than 80 percent of the sorties for the barbarous bombing of the peaceful towns and villages of Vietnam, Cambodia and Laos. Thai pilots also participated in these piratical raids.

Although in July 1976, the American Air Force and subunits of the U.S. Army, as a result of the decisive actions of the public, were forced to leave the nation, the Pentagon has not ceased using the Thai air bases and in addition has intensified its activities here after the Reagan Administration came to

power. Just since the beginning of the 1980s, Thailand has ordered an entire arsenal of weapons in the United States. Among them are the F-5E fighters, the C-130 transport aircraft and helicopters.

Under pressure from Washington the Thai pro-imperialist forces have made the nation's territory available for the bands of Pol Pot and his henchmen. Washington has clearly stated its desire to turn this state again into a support base and make it a permanent link in the so-called "strategic line of defense" in the zone of Southeast Asia. In 1986, the United States granted Thailand \$100 million in military aid. The numerous instances of the use by the Americans of the largest air base at Utopao also confirm American intentions to strengthen themselves in this area. This base as well as the bases at Takli and Donmyanto which the United States plan to get would serve as transloading bases for the U.S. Air Forces on routes between the air bases of Clark Field and Diego Garcia.

The Thai Air Force is also frequently put into action and it constantly violates the air frontiers of Cambodia. The Thai ships also invade its maritime possessions. All of this leads to instability and a heightening of tension not only on the Thai-Cambodian frontier but throughout Southeast Asia and is a threat to world peace.

At present, the United States has no more important ally than Japan in the Asian-Pacific Region. Here the United States has the use of over 30 major bases at which are located the headquarters and numerous units of the 5th Air Army as well as other military installations. Among the garrison of over 55,000 American troops are the large air bases of Yokota and Kadena, Irumagawa, Iwakuni, Misawa, Titose, as well as the bases of Yokosuka and Sasebo for American carriers. "They are becoming," commented the book "Bases in Japan" published in Japan in 1983, "an automatic part of American strategy."

Japan has agreed to modernize the airfield not far from Tokyo at the Air Force Base in Hakura as well as build a base on the island of Iwo Jima. A division and air wing are stationed on the island of Okinawa, the importance of which from the military viewpoint for the United States cannot be overestimated. The importance and capabilities of Okinawa can be seen from the fact that the Kadena Air Base located here is the only place outside the United States chosen for an emergency landing of the Shuttle spacecraft.

The expanding of the network of American bases on Japanese territory and the experience of the mutual use of the bases and facilities by Japan and the United States serve as concrete proof of the qualitatively new stage in the development of the American nuclear strategy in the Asian-Pacific Region and the improvement in the system for conducting joint military operations by these states. All of this represents an extremely serious danger for the USSR and the other socialist countries as well as for the national liberation movement in Southeast Asia.

South Korea has become a most important military staging area for the Pentagon in the Far East. The territory of this country is the only one in the given region where the U.S. air bases are directly along the frontiers of a

socialist state, North Korea, and close to the territory of the Soviet Union. The more than 40,000-strong grouping of American troops stationed at 40 military bases in South Korea include the personnel of a U.S. Air Force division. The American hawks, in continuing to increase international tension, in the 1980s have strengthened the concentration of significant air contingents in South Korea. Several-score F-16 fighter bombers have been shifted here, to the U.S. air bases, for reinforcing the American tactical air forces. The ruling circles in South Korea, in turn, view the presence of the U.S. air bases in the nation as guaranteed help in their struggle against the revolutionary actions of the Korean people.

In exacerbating the situation on the Korean Peninsula, the United States has endeavored to conceal its adventuristic policy by the well-worn theses concerning the mythical "threat from the North." However, precisely the presence of American troops in South Korea, the growing militaristic trend in the policy of the puppet regime and their increasing military activeness are creating obstacles on the path to ensuring peace and security in the Far East and in Asia as a whole.

The U.S. Air Force has provided itself with strong positions in another part of the Pacific, Australia. Here there are more than 30 U.S. air force and naval bases.

The American journal FOREIGN POLICY has written about what the American air bases and military facilities have brought Australia: "The impression is created that they jeopardize the very existence of Australia, turning the area which previously did not have to fear a nuclear strike into a strategic objective.... The presence of the bases has turned Australia not only into a potential strategic target but also into a political hostage."

The U.S. air bases in Australia, the American control over the national Australian air bases as well as deliveries of equipment and weapons and military supplies have made it possible for the Pentagon to envisage the use of Australia as a connecting link for putting together a new, wider Pacific military-political bloc on the "axis" of ASEAN--ANZUS with the participation of Japan and South Korea. The new military alliance as a whole should become a tool for building up American troop contingents in this area, for establishing dumps of equipment and aviation weapons and, ultimately, for widening American opportunities to impose its will on the independent states of the region, to influence the development of the situation here in its interests and apply ever-greater pressure on the national-liberation forces.

As was emphasized by the Japanese newspaper AKAKHATA, a Pentagon representative Salimon has stated that in the event of the outbreak of war against the Soviet Union in Europe or the Near East, the American Administration has proposed to open an Asian-Pacific front, while the American nuclear forces in this region would have the mission of blockading the Soviet naval forces in the Sea of Japan, Sea of Akhotsk and Bering Sea, and attacking Soviet nuclear submarines as well as military and economic facilities located in Primorskiy Kray and Siberia.



But this is not the only reason for the growing attention paid by the Reagan Administration to the Asian-Pacific Region. Above all, the desire of Washington to intensify the role of such allies as Japan and South Korea in the aim of entrusting to them a heavier portion of the burden of militaristic preparations being carried out by the Pentagon in Southeast Asia is also tied to the fact of shifting a portion of the American Far Eastern military potential into the Indian Ocean.

An important factor is in the desire to defend the interests of the American monopolies, these economic sharks which are energetically intervening into the economy of the countries located here. Thus, the share of the Asian-Pacific Region in the total U.S. trade turnover has risen from 27.7 percent at the beginning of the 1980s and this in absolute terms was \$126.5 billion, to 31 percent or to \$169 billion at present.

Behind the policy of turning this region into a citadel of the American hegemonists, Western reviewers have commented, is concealed the outright blackmail by the Reagan Administration of its Western European partners who have not always expressed their approval with certain aspects of the aggressive Washington course. The United States has endeavored to "intimidate" them by depriving Western Europe of American nuclear guarantees, by shifting military efforts to Southeast Asia and by withdrawing American troops from Europe.

Under the conditions of the growing U.S. military-political pressure on its allies and on the pro-American regimes, the establishing of peace and stability in the Asian-Pacific Region is a complicated although feasible task. This is precisely how this problem is approached by the Soviet Union which is in favor of joining forces and of broad collaboration among all who truly seek an improvement in the situation in Southeast Asia.

The initiatives set out in the speech of the General Secretary of the CPSU Central Committee, Comrade M.S. Gorbachev, in Vladivostok and in his speeches during his visit to India serve as an important contribution to ensuring peace and to developing relations of good neighbors and mutually advantageous collaboration in the Asian-Pacific Region. The Soviet Union is a convinced supporter of the view that this region not be a source of tension and an arena of military-political confrontation but actively take part in the process of forming an all-encompassing system of international security.

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## TECHNICAL PLANS, PROBLEMS OF STAR WARS EXAMINED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 6, Jun 87 (signed to press 30 Apr 87) pp 42-43

[Article, published under the heading "The Pentagon's Orbital Arsenal," by A. Nelikhov, candidate of technical sciences: "A Requisite of Nuclear Strategy"; the article was written from materials in the foreign press]

[Text] An absolute majority of Americans, who naively assume that politics is the concern of politicians and their concern is business, it must be said directly, initially liked the SDI [Strategic Defense Initiative] Program proclaimed in 1983 by President Reagan, as it was proposed as defending their interests. Over the last 2 decades, the U.S. mass information media, without being squeamish about anything, has fanned an atmosphere of fear and mistrust in the nation. The average American which the Western press so likes to set as an example wakes up and falls asleep with the constant idea of a "Soviet military threat." The SDI should supposedly protect him. Thus, in playing on fear, the military-industrial complex and the White House Administration have made headway toward the SDI.

As is known, the initial scenario for destroying Soviet ballistic missiles as originally formulated by the American mass information media was worked out by the Heritage Foundation many years ago. At that time also work was started on the third-generation nuclear missiles in the Livermore and Los Alamos labs. It was precisely the directors of these laboratories, as was stated by the Washington Center of Defense Information, who persuaded President Carter in 1979 not to sign a treaty for the universal and complete banning of nuclear testing the talks on which between the USSR, the United States and Great Britain were coming to a conclusion at that time. They persuaded him to believe in the possibility of overcoming the technological "plateau" in the development of nuclear weapons and developing the third generation weapons for the notorious SDI.

In 1983, President Reagan, in boasting of the space "shield," called the concept of "guaranteed destruction" which had been exploited without restraint for 2 decades the greatest evil. Americans this time believed him. And possibly they would still be long confused, not suspecting the danger of the plans of the U.S. military-industrial complex if it had not been for Reykjavik. The talks clearly disclosed not only the offensive but also

aggressive essence of the intentions of the U.S. military-political leadership, for the SDI would become effective only when the side possessing it launched the first strike. What weapons lie at its basis?

American specialists have called them the third-generation nuclear weapons. According to their statements, in contrast to their predecessors, the atomic and hydrogen bombs, the new weapons are selective. In using one of the four destructive factors of a nuclear explosion, they are capable of converting its energy into a different form. This can be rather narrow focused flows of penetrating radiation, electromagnetic radiation in various frequency bands, high energy microparticles or plasma. Neutron weapons are considered to be the prototype of such weapons and these, in particular, include the artillery shells of 203.2-mm caliber and the warheads of the Lance missiles which have been introduced in the American Army. In them an increased flow of neutrons is directed primarily at injuring people and has a less substantial effect on combat equipment and structures.

American specialists have called nuclear injected lasers and electromagnetic pulse weapons to be the most typical representatives of the new weapons.

The process of the interaction of laser radiation with a surface is rather complex. Schematically this comes down to the absorption of the energy in the thin surface layer. Here, depending upon the heat conductivity of the radiated material and the length of exposure of the laser beam, two types of damage are accepted. If the duration of the pulse significantly exceeds the warm-through time, for instance, of a missile wall, then there will be its burn-through. Otherwise, the process is characterized by a pulse impact.

In either instance, American specialists in their plans employ as the damage threshold an amount of 20 kilojoules per sq cm. In and of itself this figure means little to a majority of the readers and required explanation. American specialists in their calculations proceed from the fact that the size of the laser spot should be 1 magnitude with a guidance accuracy which in turn depends upon target size. In considering the diameter of the last stage of a combat missile to equal 1 m, they find the designated amount as the ratio of energy released in the explosion of a 50-kg charge of TNT to the surface of the spot. Now, if one considers that the efficiency of lasers operating with atomic and molecular transitions over the long run will reach 2 percent, it is not hard to find the power of the laser nuclear charge for an ideal medium.

The energy released in an atomic explosion for powering a laser is such that the laser is destroyed. The question arises of just how this will operate? And here the Americans, from the engineer to the president, pride themselves on their technology which, it must be said, has affected the minds of the uninitiated. The laser device after the detonating of the nuclear charge should be able to be powered by a certain type of radiation and fire at the target until destroyed. This is the idea of overcoming the technological "plateau." The supporters of the SDI portray it as a "good" which excludes "evil," while the propagandizing of "humaneness" intentionally distorts the essence of this weapon.

The sophism of Reagan and the people around him is not new but they have not succeeded in concealing all the aggressive essence of the SDI Program. "The device of all sophists of all times has been to take examples which knowingly relate to fundamentally dissimilar cases," said V.I. Lenin. The example of employing the SDI, as propagandized by the supporters of the U.S. military-political leadership, is the very same instance.

Among the wide and intense search for technical solutions initiated in the United States to develop a weapon of coherent energy, the mass information media have pointed to the X-ray laser as the most promising, light and compact. At a range in Nevada in November 1980, the Livermore Laboratory conducted the first nuclear explosion where coherent X-ray radiation was recorded as a yield. According to the published data, its brightness was  $10^{11}$  -  $10^{13}$  joules/steradian. Since then the number of tests has increased in the interest of developing new equipment. Their code names are Cottage, Galstone, Glencoe and others. The Reagan Administration has not been stingy in allocating money for these purposes. By 1988, the United States plans to develop a combat X-ray laser with a radiation brightness of  $10^{16}$  joules/steradian. Such performance provides an opportunity to judge the size of this device.

The problem is that for X-rays it is impossible to use mirror optics in the aim of magnification, forming and focusing the radiation. In the X-ray lasers this is achieved by selecting the form of the active medium which is powered by the nuclear explosion and then emits hard X-rays. It turns out that the divergence of this beam is determined by the ratio of the cross-dimensions of the emitter to the longitudinal and the best form is considered to be a long thin cylindrical rod from copper, iron, zinc and other materials.

As was shown in the book "Kosmicheskoye oruzhiye: dilemma bezopastnosti" [Space Weapons: The Dilemma of Security] (Izdatelstvo Mir, 1986), the designated brightness can be achieved with a power of the nuclear explosion of 50 kilotons, a rod length of 10 m, a diameter of 0.1 mm and their required number on the order of 100,000. This means that the dimensions of the laser are close to the dimensions of space stations of the Salyut or Mir type. Its housing would be a cylinder 4 m in diameter, for the generators of which they would need to install 100,000 decimeter rods with a nuclear charge located on its axis. The laser should be provided with a search and guidance system as well as a propulsion unit (see the diagram).

It must be pointed out that for an X-ray laser there is a very definite dependence between the power of the nuclear charge, the active mass and the number of rods, their length and diameter. For example, shortening the length of the rod by a magnitude requires an increase in the power of the nuclear explosion by 10-fold but does not change the number of rods for the given active mass.

An X-ray laser is effective only in airless space, and even at an altitude of 100 km, the vestigial traces of the atmosphere significantly weaken the X-ray radiation.

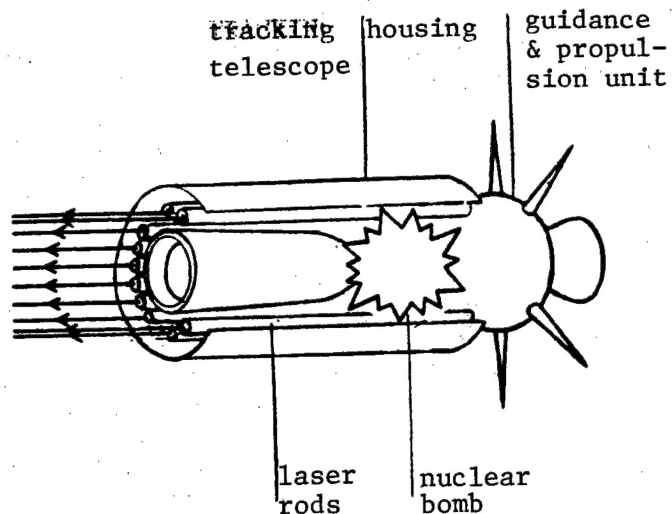


Diagram of X-ray Laser

Under the effect of the energy of the X-ray radiation, there is the instantaneous evaporation of the surface layer of the missile or satellite housing and this leads to the rise of a strong shock wave. This causes their mechanical destruction. According to information published in the American press, each of the first-generation X-ray lasers is capable of hitting one space object. Second-generation lasers will have greater capabilities.

In 1984, according to information in the journal FUSION, the Los Alamos Laboratory began to work on developing a nuclear-pumped gamma laser. As American specialists feel, it will have advantages over the X-ray one in the fact that its radiation is capable of penetrating through the atmosphere easily and without deflection. Here among the merits are its ability to "tune" to a wave length whereby the radiation will be intensely absorbed by the missile warhead and put its charges out of commission.

At present, specialists from this laboratory are searching for ways to pump the active medium to create coherent gamma radiation. In particular they are studying a variation of two-stage pumping. Initially, the nuclei of the atoms in the active medium will be converted to an excited state under the effect of extended neutron radiation and then with the aid of a nuclear explosion they will be given the pulse necessary to obtain the required gamma radiation. Dates for demonstrating the idea of such a laser have also been named and these are several years off.

In the explosion in 1962 of a hydrogen bomb over Johnston Atoll in the Pacific, a "mysterious" phenomenon occurred. Thousands of kilometers away from the site of the explosion in the Hawaiian Islands, all of a sudden radio communication was disrupted and several American satellites ceased active existence. Incidentally, this mystery was soon solved. It turned out, the effect of the gamma rays formed in the nuclear explosion on the air molecules led to the rise of so-called Compton electrons which, in "coiling" on the force lines of the earth's magnetic field, formed an electromagnetic field.

Its power depended upon the size of the nuclear charge. But since the entire process occurred virtually instantaneously (suffice it to say that it outdistanced the passage of the nuclear explosion's front), each time a strong electromagnetic pulse (EMP) appeared.

Another mechanism of the EMP was related to the X-ray radiation of the nuclear explosion which, in ionizing the atmosphere, had a pulse effect on the structure of the geomagnetic field which, in turn, served as the generator of the electromagnetic pulse. Such a pulse is virtually safe for man but has a destructive effect on modern electronic equipment which do not have special protective devices. Under the effect of the electromagnetic wave, strong currents are aimed at the housing of the irradiated object and these, in penetrating inside, create peak loads there.

For developing the EMP weapons, American specialists are searching for a device capable of directing the beam of gamma quanta from the nuclear explosion in the required path. Among other promising technologies, the journal SCIENCE has mentioned the EMP generators, the so-called gyrocons. Such a weapon is viewed by the military-political leadership as an effective means for disrupting control and communications systems on the earth, in the air and in space.

The work being done in the United States to develop the third-generation nuclear weapons is having a negative impact on improving the international situation. This became an impediment at the talks in Reykjavik. But Reykjavik, like the Soviet moratorium on nuclear testing, buried the myth of the "Soviet military threat."

At present, when a majority of the world's people has clearly recognized the danger of the SDI, the number of Americans is growing who do not agree with the plans of the nation's military-political leadership. A poll conducted in the United States showed that two-thirds of the persons questioned considered the SDI unnecessary and 80 percent do not believe in its effectiveness. The "Union of Concerned Scientists" collected 3,700 signatures urging the government to stop work on the SDI. This appeal was signed by 15 Nobel Prize winners. In August of last year, the ideologist and founder of work on the X-ray laser, PhD Peter Hagelstein, quit Livermore Laboratory recognizing the intentions of his leadership.

Will there be or will there not be third-generation nuclear weapons? Will the world slip toward nuclear disaster? These questions are being settled now and it is not too late to halt the evil program of universal destruction. This was clearly stated by the General Secretary of the CPSU Central Committee, Comrade M.S. Gorbachev, in his speech at the International Forum in Moscow "For a Nuclear-Free World, For a Humanism of International Relations": "At present, the sovereignty of a given state extends to the atmosphere above national territory. A state possesses an indisputable right to protect this against invasion. But there will be a much greater danger from space where they now wish to locate weapons. Such intentions are an attempt to create a new instrument for blackmail in relation to independent states. For this reason, is it not time on the international legal level to raise the question



of banning the lofting of weapons into space over the heads of people in other countries?"

At the same time, under the conditions of the constant fanning of military psychosis by the United States, the Soviet Union, in being guided by the interests of its own and its allies' security, has been forced to abrogate the unilateral moratorium which lasted more than 18 months and resume the testing of nuclear devices. Here, as was stated at a briefing for Soviet and foreign correspondents on 26 February at the Press Center of the USSR Ministry of Foreign Affairs by a representative of the USSR Ministry of Defense, Maj Gen G. Batenin, our nation does not intend to copy the U.S. nuclear program. The Soviet Union, in its testing, he said, will proceed exclusively from the necessity of fundamental research, the carrying out of national economic tasks, the testing of equipment and weapons for resistance to the damaging factors of a nuclear explosion, including for resistance to those weapons which are being developed under the plans of the American SDI Program and developing charges to maintain strategic parity with the United States in terms of nuclear weapons.

Our fundamental stance vis-a-vis the task of halting nuclear testing remains as before. We, as previously, view the solution to this as a primary measure on the way to curtailing nuclear weapons and their subsequent complete elimination and we will support the efforts of all states moving in this direction.

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